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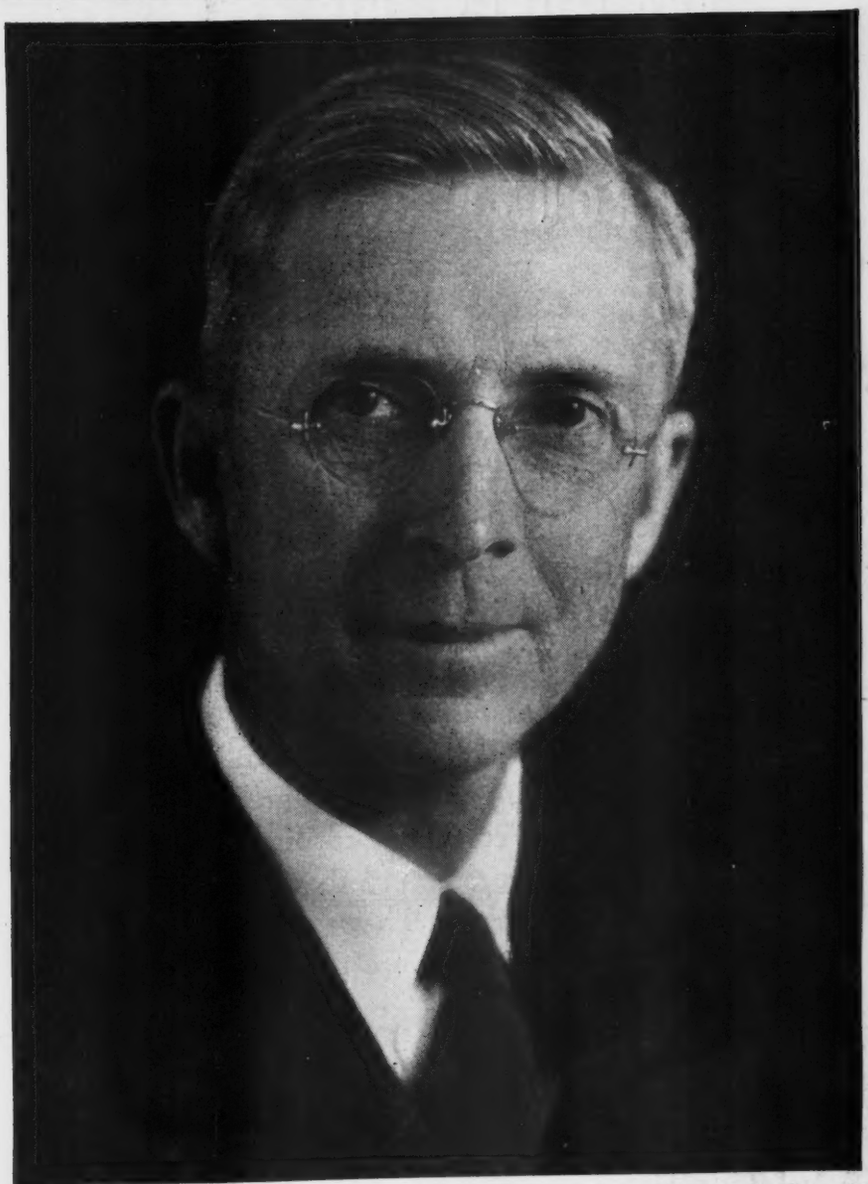
# FRUIT GROWER



PROF. B. S. PICKETT, Re-elected President American Pomological Society—See Page 12.

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The National Fruit Magazine of America

# American FRUIT GROWER

Representing a Billion Dollar Industry

JANUARY Vol. 56 (Title Registered in U.S. Patent Office) No. 1 1936

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# THE RESIDUE PROBLEM

ONE of the perplexing problems which faces the fruit industry in many sections of the country is that of spray residue removal; to wash or not to wash. While it is perhaps premature to attempt to outline a policy regarding this controversial question, the growers must make plans for the immediate future. What shall they be?

Without going into the history of the development of public sentiment and official action from 1906 when the Food and Drug Act set up the figure of 0.01 grains of arsenic trioxide per pound of fruit as the tolerance for interstate shipments, to the present time when .018 grains of lead per pound is in force, the trend can easily be followed. That still further reductions of lead tolerance are contemplated would not be difficult to forecast.

It would seem to be only just and fair to accept the principle that no food product, whether it be apples or candy, should be sold to the public if it is *known* to contain any substance injurious to health. Any other principle is untenable.

The question which the fruit industry raises, and justly so, is whether there is evidence that the amount of arsenic and lead carried on sprayed fruit is likely to impair the health of those who are most susceptible to the poisons present. We suspect that most fruit growers are inclined to question the evidence and feel that they are entitled to more reasonable assurance regarding it. Furthermore, it is well known that many other articles of food contain toxic substances and the air is frequently contaminated, which is an even greater source of trouble. The fruit industry should go along with other agencies in reducing the menace but not carry all of it.

But regardless of this situation, it would appear to be a case where the public would consider *the fruit* guilty until it is proved innocent because the health of their children and themselves is at stake. With any such view as this prevailing it would appear that the grower whose fruit shows a residue of lead, arsenic, or fluorine in excess of the amount set up as the maximum load will find it the wisest course to prepare to remove it and reduce the amount to a point that is not considered dangerous. To meet grading regulations and consumers' demands, all dirt or visible residues must be removed. This advice would hold until it can be shown that larger amounts are not injurious or until some effective substitute for these spray materials is found which is free of suspicion from the standpoint of health.

*In the meantime AMERICAN FRUIT GROWER believes every effort should be made to finance in an adequate way a research program which will determine the point at which these materials are injurious. Cordial co-operation with the American Medical Association and government authorities should be given. On the other hand, it would seem just to ask the government to halt any further reduction in the tolerance until the fruit industry can become adjusted to it and until better evidence of injury can be broduced than now seems available.*

# INTERNATIONAL HARVESTER *Thanks You for the Biggest Increase in Registrations Made by Any Leading Truck . . . and looks forward to another big year of transportation progress*

Above: A Model C-30 (157-inch wheelbase) hauling oranges out of a grove to the local packing plant in Orange County, California. Truck owned by Simon Toussau, Anaheim, California.

Note: R. L. Polk & Co. reports 74% gain in International Truck registrations in the United States—and 26% gain in registrations for the entire truck industry—for the first ten months of 1935 over the same period in 1934.

This big increase in International registrations climaxes a long, steady record of International Truck popularity. For more than a quarter-century business men have come to International Harvester when they have needed the most reliable truck transportation and the soundest kind of truck economy. International's position in the industry has long reflected this well-established, growing popularity.

When the demand for such a well-established truck is increased 74% in any year, *that is news for all truck buyers.* And it is a guidepost for the man who wants the most for his truck money. Go to the near-by International Truck dealer or Company-owned branch and see for yourself just why International Truck registrations have increased 74% while registrations for the entire truck industry have increased 26%.

**INTERNATIONAL HARVESTER COMPANY**

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**606 So. Michigan Ave.** **Chicago, Ill.**

# INTERNATIONAL TRUCKS

*A New Year's View of—*

# THE APPLE EXPORT SITUATION

By R. G. PHILLIPS

Secretary, International Apple Association, Rochester, N.Y.

THE apple export situation of the United States can be stated in a very few words. Since the spring and summer of 1930, difficulties have multiplied by leaps and bounds in nation after nation until the apple industry is confronted with almost the greatest trade barriers in the history of its foreign trade, running back over a half century—total and partial embargoes, quotas, tariffs, import permits, exchange restrictions and disruptions and other drastic restrictions.

An attempt has been made and is continuing to be made under the Reciprocal Tariff Act and through the medium of reciprocal trade negotiations to relax these barriers, and with some measure of success, although the countries with which negotiations have thus far been completed are not among the chief consumers of United States apples and pears, with the possible exception of Belgium.

In the Cuban agreement, effective September 3, 1934, apples and pears were placed in the low duty brackets at 1.20 pesos per 100 kilos, or a little over one-half cent per pound ($0.0054).

In the Swedish agreement, effective August 5, 1935, the so-called low duty period on apples of 10 crowns per 100 kilos, or roughly around $1.60 per barrel and 50 cents per box, was extended forward one month and begins January 1, instead of February 1. The so-called low duty period now extends from January 1 to May 1. For the balance of the year, the duty is 20 crowns or double the low duty period. The low duty period on pears, i.e., 10 crowns, was moved forward two months and now begins December 1.

By the Belgian agreement, effective May 1, 1935, the duty on apples was stabilized as a matter of right, instead of by virtue of the treaty with New Zealand, at 25 francs per hundred kilos from April 1 to August 31, and 28.75 francs per hundred kilos from September 1 to March 31. The new duties are much below the average of the old duties which prevailed prior to the Belgian-New Zealand treaty, and of which the United States was only a temporary beneficiary. The new duties are now a matter of right. The new duties amount to approximately 85 to 98 cents per barrel and 26 to 30 cents per box or basket.

The Brazilian agreement has now been ratified by the Brazilian Congress and under the agreement apples and pears enter Brazil free. The Brazilian agreement also contained a provision

**TIMELY, comprehensive and supported by undisputable facts and figures, this analysis of the apple export situation should be read by every grower in the United States, for, no matter where his orchard is located or where he markets his crop, the problems presented by the export situation as a new year dawns will, sooner or later, have a bearing, direct or indirect, upon his business. Mr. Phillips' startling review of the Apple Export Situation was first presented as an address before the December convention of the American Pomological Society in Hartford, Conn. AMERICAN FRUIT GROWER is glad to publish this report for the information and benefit of all its readers.**

# A REVIEW OF THE PAST AND

of great importance that removes sanitary restrictions from the political and trade barrier field and provides a method for settling the questions on their scientific merits. All agreements should contain a similar provision.

Entirely aside from the official negotiations with France, the opening of the French market from January, 1934, and the increased quota of April 1 this year were major achievements. The net results were apple and pear exports to France to the value of over $3,350,000, which otherwise would not have been possible. The industry owes its deep appreciation to the French government.

Negotiations are now pending with Holland, Spain, Switzerland, France and Finland and it is expected and hoped that negotiations will soon commence with Argentina. It is anticipated that the agreements with Holland and Switzerland will be announced in the near future. It is understood that the negotiations with Spain and France are pretty well advanced.

The apple export trade of the United States has been developed solely by the initiative of the industry through a period of over 50 years. It is a notable record of achievement. This great export trade of the United States in apples was built up with the channels of trade open, and by that I mean reasonably open. There was a comparatively free flow. It never could have been developed with trade channels blocked.

Starting with a five-year average of 1,412,940 bushels for the 1880-1885 period, the industry developed its exports to an average of 15,849,121 bushels for the five-year period 1927-1932, or over 11 times as many. For the 1927-1932 period exports were quadrupled over the 1919-1922 period.

Exports reached their peak in the following season (a season extends from July 1 to the following June 30th. We do not go by calendar years. For example, the crop raised in the summer of 1926 is marketed during the balance of 1926 and up to about June 30, 1927):

1926-1927.....21,294,000 bushels
1928-1929.....21,048,465 bushels
1930-1931.....20,361,472 bushels

For the 1926-1927 season, exports constituted 18.1 per cent of the commercial apple crop of the United States; 1928-1929, 20 per cent; 1930-1931, 20.1 per cent; 1931-1932, 17.3 per cent (U.S.D.A. data).

Based on present productive capacity, United States exports during normal crop seasons should, for the well-being of the producer, at least equal the 1930-1931 level of over 20,000,000 bushels.

During the five-year period, from the season of 1927-1928 to the close of the season of 1931-1932, inclusive, the United States exported a total of 79,245,608 bushels.

Destinations ranged from Hongkong, Manila, Honolulu and the Fiji Islands to Helsingfors, Finland, and from Stockholm, Sweden, to Palestine, Egypt, Morocco, Algiers, South Africa, Ceylon, Central America, Argentina, Brazil, Chile and Australasia, reaching every continent in the world.

The rank of apples as compared with other commodities is as follows:

Compared with unmanufactured agricultural commodities: For the calendar years 1927 to 1932, inclusive, apples ranked third in volume, being exceeded only by wheat and raw cotton;

Compared with all commodities: Based on volume, apples ranked 13th in 1932.

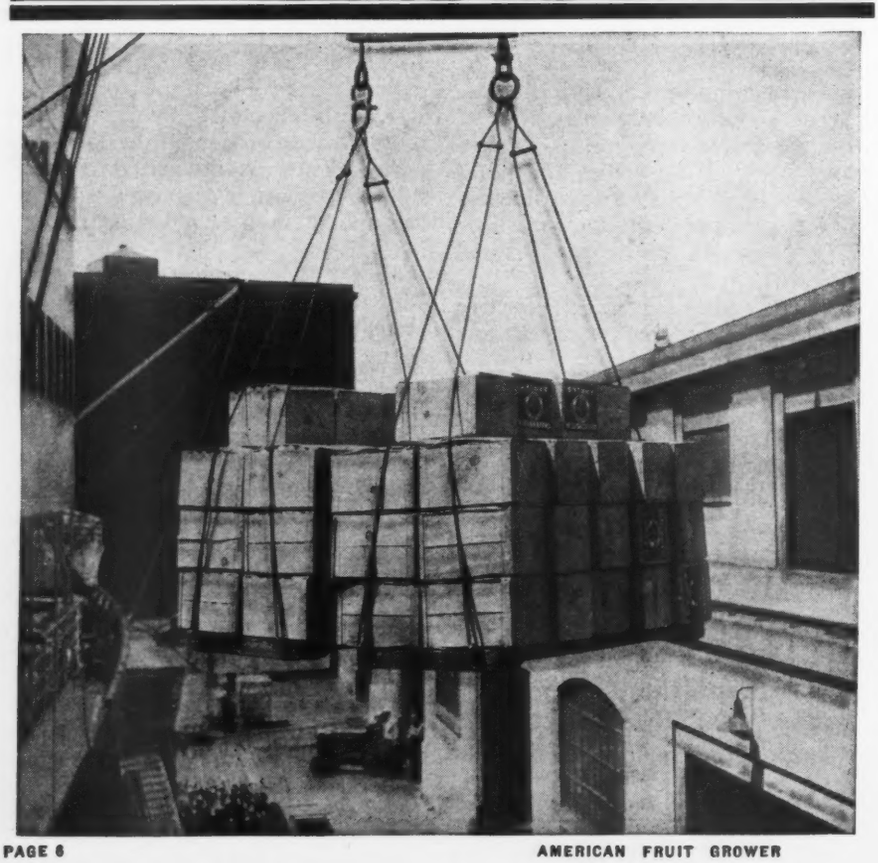
The foregoing conclusively demonstrates the great importance of the apple industry. It is an industry that is worth preserving and one that can be preserved.

The orchards of the United States have been grown and developed for over 50 years to supply world markets.

It takes from 12 to 15 years to bring an apple orchard into real production, plus a heavy investment. This production cannot be shifted like an annual crop. The manufacturing plant is built. It cannot be lightly abandoned.

Affiliated with the apple and pear industries are vast service agencies from coast to coast, including cold storages carrying from 30,000,000 to 35,000,000 packages per year; packing houses; barrel, box, crate, basket and carton makers; manufacturers of spray material and machinery; suppliers of paper and other accessories; motor trucks, railroads and steamships. The industry has furnished

**"AFFILIATED with the apple and pear industries are vast service agencies from coast to coast, including cold storages carrying from 30,000,000 to 35,000,000 packages per year; packing houses; barrel, box, crate, basket and carton makers; manufacturers of spray material and machinery; suppliers of paper and other accessories; motor trucks, railroads and steamships."**



# THE PROBLEMS OF THE FUTURE IN FOREIGN TRADE

100,000 carloads of high-class revenue freight per year to the rail carriers, much of it long haul, and the equivalent of another 100,000 carloads is moved by truck. The labor employed in hand-picking and packing the crop is a very large factor.

Adverse developments affect not only the industry itself but all of the allied agencies mentioned.

If all, or a material part, of the normal exports of the United States are prevented and the surplus forced back on domestic markets, it means, first of all, ultimate chaos on and disruption of domestic markets; and, second, it means enormous capital losses in that hundreds of thousands of trees must be abandoned or cut down. It may well mean widespread bankruptcy to producers. As we have pointed out, producers have a long time investment of money and labor in these orchards. Climatic and soil conditions were dominant factors in locating the orchards. The production cannot be shifted without enormous capital losses.

Not only would the industry, itself, be affected, as indicated, but the repercussions would extend to all the service agencies heretofore mentioned. These service agencies, including vast cold storage and packing facilities, have been provided, in whole or in part, depending on location, to serve the apple industry. All fruit agencies would feel the effects and many of them would have to close down.

The loss of foreign markets would fall with particularly crushing effect on certain groups of states, to wit: Seven in the east and five in the west, and through them on every other section.

Exports from the states of Washington, Oregon, California, Montana and Idaho for five seasons (1927-1932) have constituted an average of 21.7 per cent of the combined commercial crop of those states, and on heavy crop years they have run as high as 25.6 per cent of the crop. Montana and Idaho, however, are not important exporting states, hence the percentage as applied to Washington, Oregon and California is higher.

The states of Virginia, West Virginia, New York, Pennsylvania, Maryland, New Jersey and Delaware have exported for five seasons (1927-1932) an average of 18.1 per cent of their combined commercial crops and on heavy crop years as high as 22.7 per cent of the crop.

In another positive sense, the damage would fall with equal force on the Middle West and New England, and, in fact, every section, the normal domestic markets of which would be glutted by the surpluses from exporting territory.

**"IF ALL, or a material part, of the normal exports of the United States are prevented and the surplus forced back on domestic markets, it means, first of all, ultimate chaos on and disruption of domestic markets; and, second, it means enormous capital losses in that hundreds of thousands of trees must be abandoned or cut down. It may well mean widespread bankruptcy to producers."**

Great Britain has been by far the largest market for United States apples, followed by Germany, Holland, France, Belgium, Sweden and Denmark. United States apples, however, reach directly and indirectly a large number of countries.

In South America, Argentina was the best customer for United States apples, followed by Brazil.

The general range of exports of United States apples extends from China to Finland and from Finland to Palestine, Egypt, Algiers, South and Central America and Australasia.

Trade barriers are made up of nearly every known device, such as total and partial embargoes, high and even prohibitive tariffs, quotas, exchange restrictions, import permits, drastic and sometimes highly technical sanitary restrictions, etc.

The major trade barriers have been placed since the summer of 1930, and particularly from 1931 on. We, therefore, take the 1930-1931 season, which was practically a peak season as an index of 100.

The following table shows what has happened to the United States apple industry down to the week ending January 12, 1935:

TABLE I

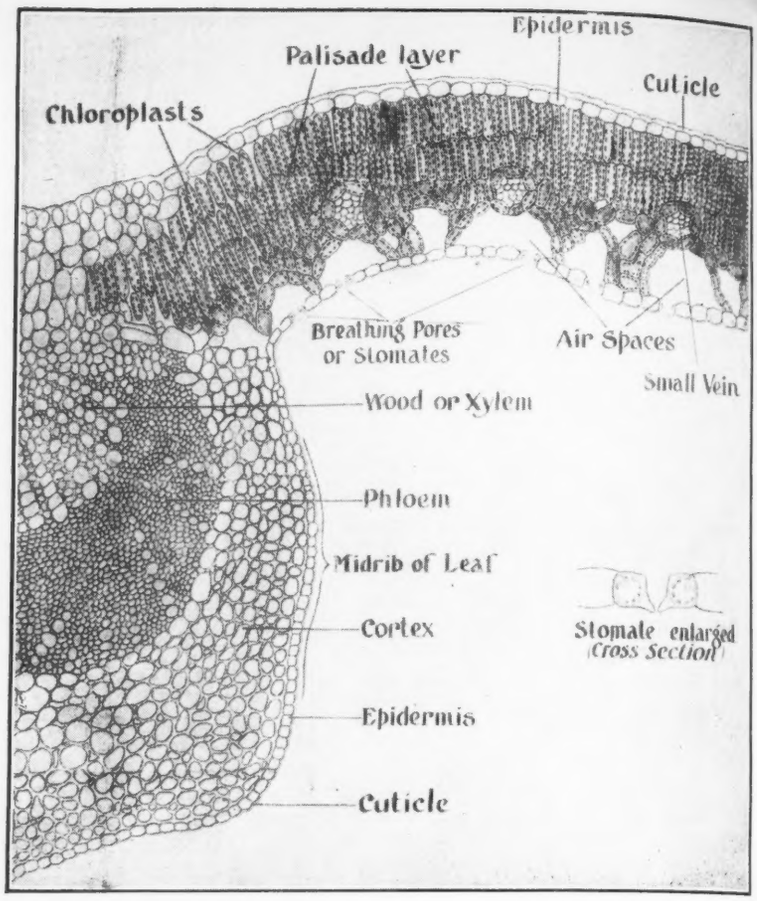
| *Season* | *Bushels Exported* | *Percentage* | *Loss* |
|---|---|---|---|
| 1930-'31 | 20,361,472 | 100 | |
| 1931-'32 | 18,076,661 | 89 | 11% |
| 1932-'33 | 13,753,809 | 68 | 32% |
| 1933-'34 | 12,262,348 | 60.2 | 39.8% |
| 1934-'35 | 7,821,141 | 38.5 | 61.5% |

This is a loss of 12,540,431 bushels from the 1930-1931 season, or over a range of only four seasons.

A loss of 12,540,431 bushels in four seasons presents more than a grave danger to the industry in the United States. It throws a load on the domestic market which the domestic

*(Continued on page 30)*

A cross section through small part of apple leaf highly magnified




*Importance of Leaf Surface In Apple Trees*

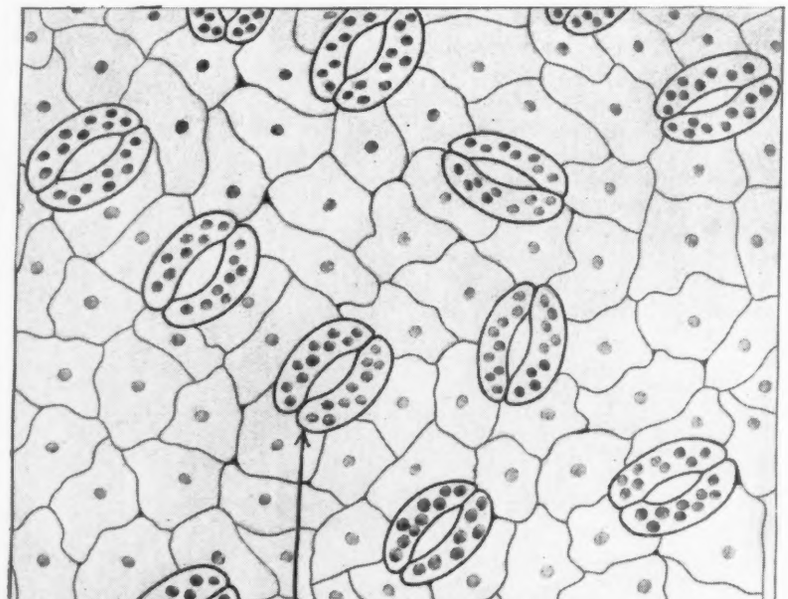
# FACTORS INFLUENCING EFFICIENCY OF FOLIAGE

By A. J. HEINICKE
Cornell University

AS every fruit grower knows, a healthy leaf surface is needed for the development and maintenance of a good bearing surface and for the production of heavy crops of high quality fruit. The leaf surface is indispensable since it provides the bulk of materials used for building shoot and fruit tissues and for furnishing energy for the growth processes. Of course, fertilizer elements such as phosphorus, potassium, nitrogen and many others are also essential for growth and fruiting, and such nutrients must be applied to the soil wherever they are deficient. The green plant, however, provides its own food materials, such as starch, sugars and related substances which are built up in the leaf from the chemical elements found in water and air.

Frequently the leaf surface of apple trees is not extensive enough to meet the maximum requirements of all its growing and maturing tissues, especially if there is a heavy set of fruit. Under such conditions there will be unusual competition for whatever food is available. Even though the fruits are able to obtain a larger proportion of the carbohydrates when there are too many apples in relation to the leaf surface, they may nevertheless be small, off color, and show relatively poor eating and keeping quality. The shoot and root growth and the diameter increase of the trunk and branches will be greatly restricted. There will be little if any stored

*(Continued on page 22)*




Under surface of apple leaf showing breathing pores. There may be as many as 200,000 pores per square inch of leaf surface.

Few of the millions of consumers of fruit pies realize that a great portion of the pies they eat in the restaurants of the nation are filled with "fresh fruit" which has been frozen and held in storage until used.

# FROZEN FRUITS AND FRUIT PRODUCTS

By M. A. JOSLYN
University of California

THE development of the preservation freezing or frozen pack in recent years has been the outstanding feature in the preservation and distribution of small fruits. The frozen product closely approximates the fresh in color and flavor and for this reason is being used extensively in preserves, jellies, jams, bakery products, frozen dairy products and juices. It is not only of value in increasing the operating season of fruit products manufacturers, but also for increasing the season during which the fruit may be served in the home or the institution. Beginning with a pack of approximately 1,000,000 pounds in 1918 and reaching a pack of 59,000,000 pounds in the Pacific Northwest, the industry annually supplies the bakers and preservers with some 45,000,000 pounds of fruit.

The outlets for frozen fruits are fruit products manufacturers, such as preservers, soda fountain supply firms and juice manufacturers; bakers who use large amounts of red sour pitted cherries and also other fruits; ice cream manufacturers who use strawberries in six per cent of their total products and other fruits in another six per cent of the annual packs of some 350,000,000 gallons of frozen dairy products; soda fountain syrups, producers of flavorings and extracts and fruit juice producers who use large amounts of prunes, blackberries and loganberries; hotels, restaurants, clubs and other institutions to supply their culinary needs; and to a limited extent retail food distributors for sale to consumers.

The frozen pack method has developed in Oregon and Washington more rapidly than elsewhere because of conditions favorable to berry growing and because increasing production and great distance from eastern markets have forced the growers to utilize all possible outlets. Strawberries and raspberries are packed to a greater extent than other fruits. Moderate quantities of loganberries and blackberries and small quantities of black raspberries, currants, gooseberries, prunes, rhubarb and huckleberries are also packed in the Oregon-Washington district. Four-fifths of the United States output comes from the Pacific Northwest where some 60 companies pack frozen fruit.

Second in the production of frozen packed fruits is the tri-state district of Delaware, Maryland and Virginia. The principal district is near Norfolk and Baltimore. Some strawberries are frozen in North Carolina, Michigan, Arkansas, Missouri, New York, Tennessee, Ohio and Louisiana.

Red sour pitted cherries are packed in New York, Wisconsin, Michigan and Colorado, as well as in Oregon and Washington, for baking trade.

California, Utah and Idaho have several firms packing fruit, and some fruit is frozen packed in British Columbia. Orange juice and crushed fruits are frozen to a limited extent in California.

The process depends upon arresting the activities of the agencies causing spoiling: microorganisms—bacteria, yeasts and molds, respiration processes and other enzymatic changes, and chemical changes, particularly oxidation. The fruit should be stored at temperatures low enough to prevent the growth and action of the organisms capable of growing upon it and to reduce the enzymatic changes. Although at the commonly used temperatures of about 10°F there is no appreciable microbial activity, enzymatic activity, particularly oxidative changes, can occur. It is thus necessary to protect the product from changes in flavor and color during freezing storage. This is accomplished by the use of tightly sealed

*(Continued on page 18)*

# CAUGHT BY THE CAMERA AT STATE MEETINGS

Above—Winner of the "Master Award" of the Illinois 95 Per Cent Clean Apple Club for 1935, is O. G. Jones of Mount Sterling, Ill. Mr. Jones' record of 99.1 per cent was the highest of those selected for this club during the past year.

PHOTOGRAPHS BY
AMERICAN FRUIT GROWER
STAFF PHOTOGRAPHER

Left—W. K. Bristol (left) and Arlie L. Hopkins, who were elected vice-president and president, respectively, of the Michigan State Horticultural Society, stop for a moment at the 65th annual convention to congratulate each other on the outcome of the election. Mr. Hopkins was re-elected to his post following the tradition of the society to have the president serve two terms

G. Leslie Smith (left) who was elected president of the Illinois State Horticultural Society at the 80th annual meeting of the society held at Decatur December 11 to 13, has an interested observer in the person of Joe B. Hale, re-elected secretary of the society, while he is preparing his entry in the commercial exhibit of the show held in connection with the meeting.

Not the Republican presidential candidates but Guy Beauman (left), prominent Illinois grower, and Prof. W. P. Flint, chief entomologist of the Illinois State Natural History Survey, caught while discussing an important question during the recent Illinois Hort Society meeting at the State Armory in Decatur.

# STATE HORTICULTURAL NEWS

## 80th Illinois Meeting

IN the State Armory at Decatur, the 80th annual meeting of the Illinois State Horticultural Society was held December 11-13. Interesting commercial exhibits filled the main floor of the armory and these were garnished with the apple show of the members. This show included the regular plate classes as well as a 25-bushel commercial contest.

Led by President George F. Shoff, who was completing his second term in this office, the members listened to an array of fine speakers during the three-day program.

Outstanding on the program of the sessions were the talks on spraying and lead residue removal problems. These talks were delivered by research workers from the University of Illinois and the Illinois Agricultural Experiment Station, as well as by others brought to the meeting from other states.

In addition to the talks on pest control, Dr. M. J. Dorsey gave a review of the research work now being done at the Illinois station and other points.

Dr. H. E. Barnard, secretary of the National Apple Institute, talked on the work of his organization and during his message recalled that Illinois was the first of the state societies to give financial backing to the work of the institute. His message told of the various methods the institute is employing to contact the housewife and gave results obtained by the use of the institute clip-sheet by the home editors of the various newspapers and magazines in all sections of the country. The results to date are fine and the work was unanimously endorsed by the Illinois growers.

Fall application of fertilizers was stressed in the talk given by Dr. J. H. Gourley, Ohio Agricultural Experiment Station Department of Horticulture Chief. He stated that the greater convenience and the absence of conflicting work were the attributes of fall fertilization at the present time. According to Dr. Gourley, the nitrates are taken into the roots in the winter and in the spring no condition of the soil will prevent them moving up in the plant when the proper temperature hits the top of the tree.

"Dusting for the Control of Apple Scab" was the title of the talk given by Prof. H. H. Whetzel of the Department of Plant Pathology of Cornell University. He stated that the reason there has not been an increase in dusting is that the growers have inherited a knowledge and habit which has tended for many years toward the sprayer, but he believes there will be an increase in dusting for apple scab in the future.

Prof. W. P. Flint, Illinois State Natural History Survey and Illinois Agricultural Experiment Station, led the list of speakers on pest control problems. His paper was prepared in collaboration with Dr. M. D. Farrar, also of the experiment station. Drs. W. A. Ruth and V. M. Kelly of the Department of Horticulture of the University of Illinois, presented a paper on the present status of the washing problem. Clarence T. Smith of Flora, Ill., gave the results of his washing operations during the past season. Other speakers from the Department of Horticulture at the University were Drs. J. W. Lloyd, H. W. Anderson and K. J. Kadow.

Speakers from the Illinois Department of Agriculture at Springfield were H. M. Newell, superintendent, Division of Standardization and Markets, and J. H. Jacobson, agricultural statistician.

G. Leslie Smith of Rock Island was elected president of the Illinois society. Fred Heaton and O. G. Jones were elected first and second vice-presidents, respectively. Re-elections were Joe B. Hale as secretary and W. S. Perrine as treasurer.

O. A. James, governor of the 45th district of the Rotary International, who is a fruit grower at Salem, was the principal speaker at the banquet.

## Tenn. Elects Officers

OFFICERS elected for the coming year at the 31st annual meeting of the Tennessee State Horticultural Society were Grover C. Eldridge, Sale Creek, president; E. B. Bonham, Crandull, J. C. Patrick, Fayetteville, and C. E. Heckle, Jr., Memphis, vice-presidents; and G. M. Bentley, Knoxville, secretary-treasurer.

One of the outstanding talks on the program of the meeting, which was attended by more than 125 members, was that of Dr. Fred W. Hofmann, who talked on fertilizers for young and mature trees. Dr. Hofmann is horticulturist at the Virginia Agricultural Experiment Station.

Growers took an active part in the discussions, which were led by professional workers from the state college and by growers who gave the results of their experiences.

G. M. BENTLEY, *Sec'y*,
Knoxville.

## W. Va. Advertising Apples

FORGING ahead with a four-point advertising program for apples, the West Virginia Horticultural Society has shown that good results may be obtained from advertising endeavors at a small cost.

Apple shows, personal contact with dealers and jobbers in the larger markets, support of the National Apple Institute and the dissemination of pictures and news stories of apples were the four lines of attack on the lower-priced market.

The principal venture this season was the apple show held at Martinsburg, November 5-7. The charge for the affair was just 10 cents for adults and five for children. There were 6000 persons in attendance during the three days of the show and this revenue, added to that derived from commercial exhibits, held the cost of the show for the society down to about $150. The entire cost of the show was $700 and, in addition to the good attendance, netted the society many press notices in newspapers and magazines.

This year the society co-operated with

*(Continued on page 16)*

"THE HOUSE THAT APPLE JACK BUILT," one of the unique exhibits at The Apple Show, Martinsburg, W. Va. Miss Elizabeth VanMetre and Mrs. Helen Burns Miller are the two "pippins."

# AMERICAN POMOLOGY

*A Page Conducted in the Interests of the American Pomological Society*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President: B. S. Pickett, Ames, Iowa.
Vice President: W. A. Taylor, Washington, D.C.
Vice President: W. S. Blair, Kentville, Nova Scotia.
Secretary: H. L. Lantz, Ames, Iowa.
Treasurer: H. C. C. Miles, Milford, Conn.

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**EXECUTIVE COMMITTEE**

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N. E. Hansen, Brookings, S.D.
Wesley Hawley, Ludington, Mich.
W. S. Perrine, Centralia, Ill.
H. L. Price, Blacksburg, Va.

**EXECUTIVE COMMITTEE**

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T. J. Talbert, Columbia, Mo.
C. C. Taylor, Louisville, Ky.
W. P. Tufts, Davis, Calif.
H. B. Tukey, Geneva, N.Y.
R. A. Van Meter, Amherst, Mass.


Edited by H. L. LANTZ, Secretary

## CONVENTION NEWS

THE 51st convention of the American Pomological Society, held in joint session with the Connecticut Pomological Society, December 10-13 at Hartford, Conn., was a pronounced success from beginning to end. Interest in the convention increased, and was sustained throughout the program which ended Friday afternoon. Phases in fruit growing discussed during the sessions included small fruits, peaches, apples, marketing, National Apple Institute, storage, soil management, pest control and spray residues. These subjects were handled by fruit growers and by professional horticulturists of national reputation.

The great success of the meetings was due to the energetic co-operation of all the New England and other eastern states and the American Pomological Society. The Connecticut Pomological Society as host, and under the efficient leadership of President John Lyman and Secretary H. C. C. Miles, made this event one long to be remembered.

The New England Fruit Show was staged in the huge State Armory. This show was a most artistic blending of fruit, flowers and allied horticultural industries, together with a large and excellently staged group of commercial exhibits where fruit growers could study all that was new in supplies of all kinds.

The exhibits of the various states and other agencies were most original in design and represented great skill in assembling the material in a blended and artistic manner. The A.P.S. exhibition consisted of an outstanding showing of new and old varieties.

Dr. W. S. Blair brought 72 plates from the Dominion Experimental Farm at Kentville, Nova Scotia. Dr. M. B. Davis sent in 26 plates of four new varieties. The Missouri State Fruit Experiment Station, Mountain Grove, sent trays of six newly named varieties. The Connecticut State College at Storrs showed 92 plates of new and old varieties. The New York Agricultural Experiment Station, Geneva, showed seven new varieties. The Iowa Agricultural Experiment Station, Ames, exhibited 30 plates of new varieties. These exhibits brought together perhaps the largest display of new varieties shown in recent years and proved to be of great interest to fruit growers and to professional horticulturists.

Exhibits of state horticultural societies and by other state organizations were staged by the following:

Connecticut Pomological Society
New York State Horticultural Society
Vermont Horticultural Society and Vermont Department of Agriculture
New Hampshire Horticultural Society
Massachusetts Fruit Growers Association and Massachusetts Department of Agriculture
Maine State Pomological Society and Maine Department of Agriculture
Rhode Island Horticultural Society and Rhode Island Experiment Station
Maryland and Delaware, a joint exhibit

These exhibits were instructive, spectacular and well done in every sense of the word.

Attendance at the meetings reached a total of nearly 500. Regular attendance ran from 300 to 400 at each morning and afternoon session. Fruit growers and professional horticulturists were there from all the New England states and from New York, Pennsylvania, Maryland and from as far west as Iowa.

There were many very important papers presented and interest throughout was at a high level as indicated by the questions asked from the floor. Samuel Fraser, of the International Apple Association, Rochester, N. Y., reviewed the export situation and pointed out that exports of apples from the United States had steadily shrunk from 20,361,000 bushels in 1930-31 to 7,821,000 bushels in 1934-35. "Europe," he said, "is determined to grow its own apples, and has planted considerable acreages. Em-

*(Continued on page 30)*

## OFFICERS ELECTED FOR 1936

**President—B. S. Pickett, Ames, Iowa**
**Vice President—Laurenz Greene, Lafayette, Indiana**
**Vice President—W. S. Blair, Kentville, Nova Scotia**
**Secretary—H. L. Lantz, Ames, Iowa**
**Associate Secretary—H. J. Rahmlow, Madison, Wisconsin**
**Treasurer—H. C. C. Miles, Milford, Connecticut**

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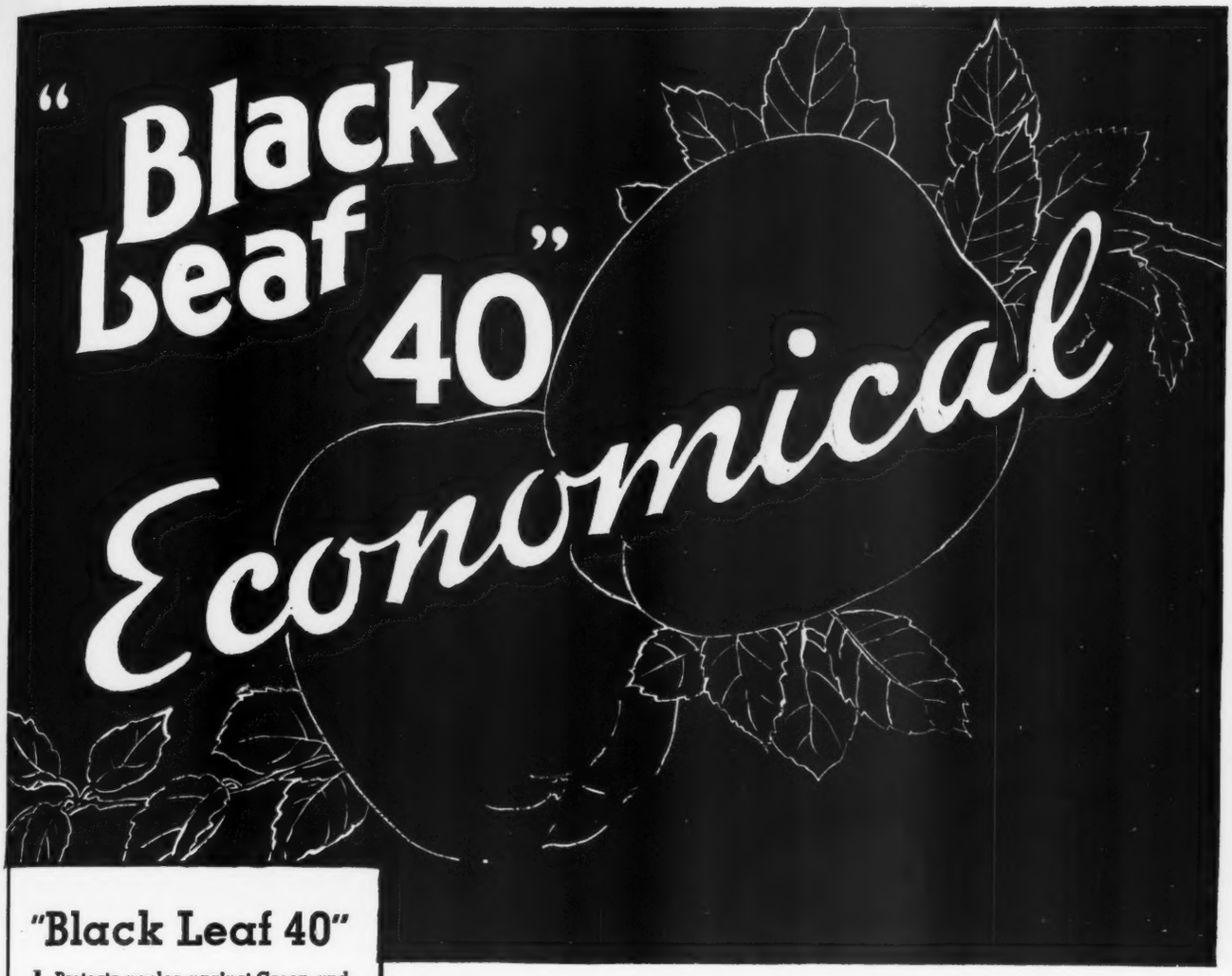
**C. E. Dutton, Milford Center, Ohio**
**R. D. Anthony, State College, Pa.**
**N. E. Hansen, Brookings, S. Dak.**
**Wesley Hawley, Ludington, Mich.**
**W. S. Perrine, Centralia, Ill.**
**H. L. Price, Blacksburg, Va.**
**E. Stuart Hubbard, Poughkeepsie, N. Y.**
**Robert Simpson, Vincennes, Ind.**
**Paul Stark, Louisiana, Mo.**
**T. J. Talbert, Columbia, Mo.**
**C. C. Taylor, Albion, Mich.**
**W. P. Tufts, Davis, Calif.**
**H. B. Tukey, Geneva, N. Y.**
**R. A. VanMeter, Amherst, Mass.**
**And one representative from each affiliated State Society.**

## PROF. PICKETT HONORED BY RE-ELECTION

**Because of his excellent work as president of the American Pomological Society since 1931, American Fruit Grower honors Prof. B. S. Pickett, head of the Department of Horticulture, Iowa State College, by placing his photograph on the cover of this issue. His re-election to the presidency of the A.P.S. this year emphasizes the trust the organization has in Prof. Pickett to lead them at a time when a number of important and controversial questions are facing the industry. Prof. Pickett has held his present position, as head of the Iowa department, since 1923. Prior to this time he was professor of pomology at the University of Illinois and head of the Department of Horticulture at New Hampshire University. His formal education was obtained at Toronto University and the University of Illinois.**

**Through 88 years of horticultural progress, the American Pomological Society has been the leading organization in the presentation and discussion of the latest trends in pomological advances. Vital questions of the fruit industry of the nation have found, through these years, timely and intelligent analysis in the sessions of this group. Prominent persons of the fruit industry know and respect this organization, and the programs of the annual conventions are graced with persons who have distinguished themselves by meritorious research or investigational work. In the annual reports of the American Pomological Society is written a history of the advance of pomology in the United States.**




## "Black Leaf 40"

1. Protects apples against Green and Rosy Aphis, Leaf Hopper, Red Bug, Woolly Aphis, Bud Moth and Codling Moth.
2. Protects pears against Psylla, False Tarnished Plant Bugs, Thrips and Slugs.
3. Protects peaches against Aphis.
4. Protects plums and cherries against Aphis.
5. Protects grapes against Leaf Hoppers.
6. Protects currants and gooseberries against Aphis, Currant Worm, Four Lined Leaf Bugs.
7. Protects trees, shrubs, flowers against Aphis, and other insects; and against "staining" by dogs.
8. Kills poultry lice and feather mites.

*See Your Spray Material Dealer*

TWENTY-SIX YEARS AGO, "Black Leaf 40" was introduced as the pioneer Nicotine Sulphate, containing 40% nicotine. "Black Leaf 40" quickly won the market. Government and State Experiment Stations subjected it to exhaustive tests in laboratory and field experiments. It solved the problem of finding a safe, effective, reliable and economical control for many pests which attack plant life, animals and poultry.

**Saves Cost ... Saves Time ... Protects Profits**

Today, because of the many uses (listed in the adjoining column) orchardists, farmers, poultrymen find that with "Black Leaf 40" on hand, the need of a wide and expensive assortment of insecticides is eliminated. "Black Leaf 40" is easy to use ... follow instructions on labels and in leaflets. Because, when used according to directions, it controls many pests, "Black Leaf 40" protects crops and the profits to be made on those crops.

*"Black Leaf 40" is sold by dealers everywhere. Insist on original, factory-sealed packages for full strength.*

3624

# THE FRUIT OUTLOOK for 1936

FIGURES recently released by the U. S. D. A. indicate that as new acreage comes into bearing the combined production of fruits will probably increase. Although the combined acreage of fruits has been declining for the past 25 years, there has been a steady increase in production. Due primarily to the rapid increase in citrus production, the combined production of fruit increased approximately 20 per cent during the past 15 years while during the last 10 years the increase has averaged about one per cent per year.

With weather conditions and care of the orchards running about average, the production for apples for the next five years will probably be slightly below the average production for the last five years. Moderate improvement in prices to growers during the next few years should come as the result of smaller prospective crops and betterment of consumers' income. If the average volume of production of the last few years is to be maintained 10 to 15 years from now, moderate increases in replacements and plantings will be necessary. Foreign countries are working toward increased production and improved quality of apples and United States exporters may expect to find increased competition in the foreign markets.

While the combined acreage of bearing and non-bearing round oranges and grapefruit will be slightly smaller in 1936 than in 1935, the acreage in bearing will be slightly greater. With average weather conditions prevailing in the four principal producing sections, combined production of oranges and grapefruit from present acreages may be expected to exceed 80,000,000 boxes, which indicates that unless new uses are found for citrus fruits, and a larger demand is developed, a portion of such a crop would be unmarketable.

Pear production trends in the United States for the last 30 years have been upward and, if there is no unusual reduction in tree numbers, will probably continue upward for the next 10 years. Unless trade barriers are prohibitive, the United States should continue to be the dominant supplier of pears for export for at least a decade. Prices in 1935-1936 have been slightly below those of 1934-1935, probably due to the smaller quantity of pears used for canning from the 1935 crop. The reduced pack of canned pears will probably help keep up the price of this product. Dried pears, despite a smaller pack, will not have such an encouraging market because of the large number of them usually shipped to Germany. This trade has ceased due to the currency restrictions in Germany. Fresh pears have a good market for the rest of the season as far as the supply side is concerned, but prices may be affected by the large amounts of apples being released on the domestic markets.

The 1935 crop of peaches, amounting to about 52,000,000 bushels, was about equal to the average annual production in 1931-1935 and amounted to approximately 20 pounds per capita. For the entire country, the present bearing capacity of peach orchards producing peaches for market as fresh fruit is not excessive and if there should be an increase in demand, a moderate rise in production would not result in market surpluses in the years of average growth conditions.

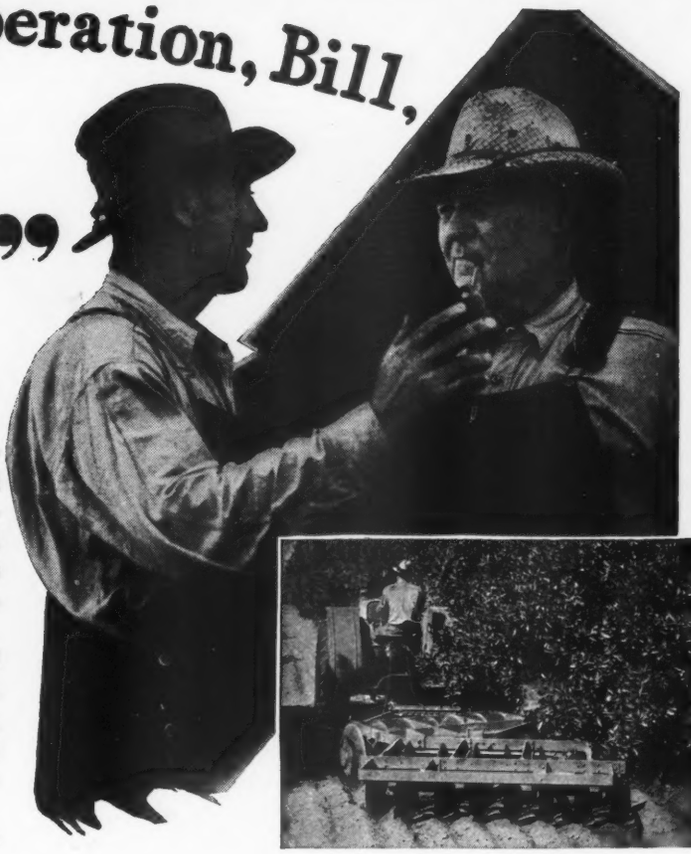
Without increase in acreage for cherries during the next few years, market supplies will continue burdensome in years of favorable growing conditions, with good supplies during the normal growing years.

Although there have been some indications of increased demand for grapes and grape products in the United States, it is still probable that there will be an excessive supply of all classes of grapes in those years when weather conditions result in yields that are near average. Competition will probably be keen in the foreign markets, and the markets will absorb only a small quantity of grapes and grape products from the United States. Present supplies of all classes of grapes indicate that there will be an ample supply to care for the market demands for several years.

Commercial strawberry acreage, for picking in 1936, is estimated at about 182,000 acres, which is 11 per cent larger than the 1935 acreage and eight per cent less than the 1934 picking acreage. Weather factors have such a bearing on strawberry production that it is impossible to predict the production figure several months in advance. Over a longer period of time the fluctuation of consumer buying power also influences the price and consumption of berries. Based on the five-year average (1929-33), the estimated 1936 production of strawberries would be 293,100,000 quarts.

The production of tree nuts has been increasing in the United States for many years. The most outstanding features in the outlook for tree nuts are a further increase in domestic production, an increase in the consumption of cashews and keener competition of pecans with other nuts.

# "For low-cost operation, Bill, I'll take a two-cylinder JOHN DEERE"





*The John Deere Orchard Tractor easily slips under low branches. Scene shows a Model AO with a John Deere Offset Disk Harrow.*

The low-cost operation and convenience of their John Deere Grove and Orchard Tractors, and the ease of handling and good work of the special working equipment are favorite topics of conversation with John Deere owners everywhere.

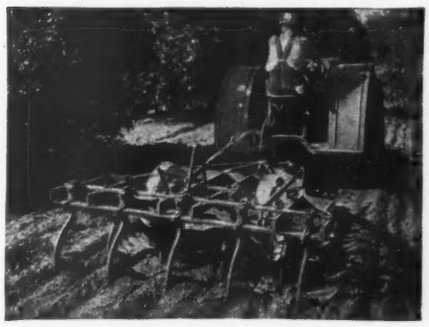
They tell their neighbors about the simplicity of the John Deere. They talk about its smoothness, its ease of operation, its convenience, its dependability, its successful burning of the low-cost fuels—about all the things that make the John Deere Tractor so outstanding.

The main reason for this economical, dependable performance is the John Deere's exclusive two-cylinder engine design. Smooth and responsive, this engine has hundreds of fewer parts. Simpler, it is easier to understand and keep in perfect running order. Rugged, it is better able to stand up to the heavy-duty loads to which you put a tractor. This means longer life.

Add the money-saving advantage of burning the low-cost fuels successfully—distillate, fuel oil, furnace oil, stove tops, some grades of Diesel oil, and similar fuels that both cost less and go farther. No wonder John Deere owners are enthusiastic about their tractors.

When you get up on the seat of a John Deere Grove and Orchard Tractor you will see for yourself many of its other features . . . the low-down construction to get under the low-hanging branches . . . the stream-lined hood . . . the wide citrus-type fenders . . . the independent foot-braking of each wheel for short turning . . . the roomy platform so that you can stand at work as well as sit . . . the four forward speeds . . . the convenience of all controls . . . the integral power shaft. Not a thing has been overlooked.

You'll want a John Deere Tractor for *your* spring work. See your John Deere dealer—arrange for your tractor NOW—avoid the delay experienced by many farmers, last spring, when there were not enough John Deere Tractors to meet the demand.



*The John Deere No. 3 Orchard Cultivator keeps out the weeds and mulches the soil. Shown with Model AO Tractor.*

*John Deere Orchard Tractors are built LOW. Notice the stream-lined hood. A compact, efficient grove and orchard tractor.*

## FILL OUT AND MAIL COUPON NOW!

Send the coupon below for this 104-page, widely-illustrated book which gives complete information on up-to-the-minute developments in tractors and power farming equipment. You'll want a copy—you'll want to keep it handy throughout the year. Just fill in and mail the coupon—the book is absolutely free.

**GET THE FEEL OF THE WHEEL**
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QUALITY FARM EQUIPMENT FOR NEARLY A CENTURY

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Please send me, free of cost and without obligation, your new, big book on "Better Farming." Also send special literature on tractors and other machines I have listed at the right.

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State ..... R.F.D. .....

# STATE NEWS

*(Continued from page 11)*

the Virginia society in sending W. S. Campfield, Virginia secretary, on a tour of the principal markets where he talked with the dealers and jobbers and gave out attractive colored stickers and literature.

Support of the National Apple Institute was wholeheartedly adopted by the society as one of the best ways to advertise fruit, with the education of the housewife to the proper use of apples and a subsequent greater consumption as the goal.

The fourth of the society's advertising points is the use of apple news stories and pictures. This phase of the program is mainly sectional in effect, but cumulative results are helpful on a national scale.

CARROLL R. MILLER, *Sec'y*,
Martinsburg.

## N. J. Meeting Notes

BYRON T. ROBERTS of Marlton was re-elected president of the New Jersey State Horticultural Society at its 61st annual meeting held in Atlantic City, December 3, 4 and 5. Others re-elected, all for terms of one year, were Ralph B. Starkey of Mullica Hill, vice president, and Arthur J. Farley of New Brunswick, secretary-treasurer.

C. H. Nissley of New Brunswick and John H. Barclay, Jr., of Cranbury, were named to the executive committee for three years. Edgar Reid of Tennant was elected delegate for two years to the State Board of Agriculture. Howard DeCou of Merchantville and J. Harold Clark of New Brunswick were elected chairman and secretary, respectively, of the newly organized Small Fruits Section of the society.

Re-elected to the executive committee were Jack Thornborrow, Millville; C. Richard Applegate, Freehold; William K. Nookstra, Beverly, and Arthur L. Ritchie, Riverton. Lewis Barton was re-elected a delegate to the agricultural board.

Samuel Fraser of Rochester, N.Y., assistant secretary of the International Apple Association, in giving one of the several interesting addresses heard at the sessions, sharply criticized the railroads for what he said was their fight to maintain rates at points above the ability of shippers to pay and declared his association for years had urged a reduction to pre-war levels. Rate reductions proposed on fruits in the northeast, he said, are about one-third under those now prevailing.

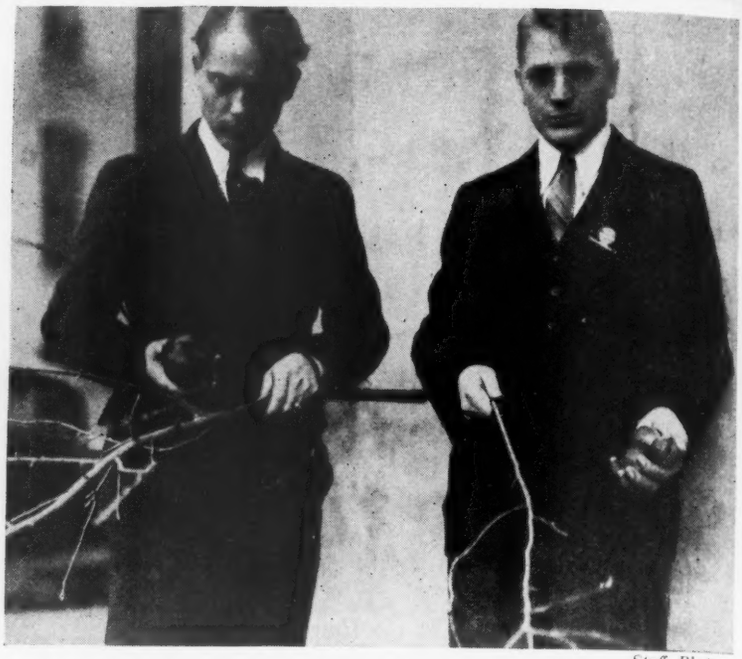
Fraser said his organization was strongly opposed to the AAA because, among other things, it favored restricted production. Asserting that a man's wealth is to be measured by his possessions, he said, "one of the strangest things that has come out of Washington was when they told us that the way to get rich was to cut down production."

"Unless export markets are opened," Fraser said, in indorsing Secretary Hull's reciprocal trade agreements, "New Jersey apple growers must either cut down their trees or be paid by the government to throw their crop away." He said trade agreements with France boosted American apple shipments an additional million bushels in 1933 and 1934, and added 25 cents a bushel to the price. Efforts to effect an agreement this year failed, according to Fraser, because this country refused to keep its agreement in purchasing French wines and wheat. He predicted that free trade will eventually become permanent.

F. W. Metzger, associate entomologist at the Federal Japanese Beetle Laboratory, in Moorestown, described newly perfected methods of protecting peach and apple crops from Japanese beetles. For peaches, he said a spray made from the powdered root of the derris plant, grown on the Malay Peninsula, had been found effective. Unlike most insecticides, he explained, the spray had no odor, was invisible, non-poisonous and left no residue on the fruit. In tests it saved complete peach crops in fields where peaches on trees not treated were completely destroyed by the beetles. For apples, he explained, a lime and aluminum sulphate spray had been developed, which could easily be washed from the fruit after use.

Warren W. Oley, chief of the Bureau of Markets of the State Department of Agriculture, told the society that New Jersey's new varieties of high quality peaches present an exceptionally good opportunity for the use of grading, branding and advertising.

## ADVOCATES OF BRANCH METHOD PRUNING



*Staff Photo*

**H. P. Gaston, left, of the South Haven (Mich.) Experiment Station, and T. A. Merrill, recently appointed assistant extension horticulturist for Michigan, show the advantages of the branch method of pruning. Merrill holds the small fruit produced on an undersized branch from which the fruit should be thinned, while Gaston demonstates the larger fruit which comes from larger, more productive branches.**

## Mich. Has Splendid Attendance

WITH an average of more than 300 at each of the program sessions and well over this number at the annual banquet, the 65th annual meeting of the Michigan State Horticultural Society was held at the Civic Auditorium in Grand Rapids, December 3-5.

The program was featured with talks and discussions by growers whose experiences were of sufficient merit to be brought to the attention of their fellow members of the society. Growers taking part in this phase of the program were Russell Evarts, Hunters Creek; C. Taylor, Albion; Arnold Schaeffer, Grand Rapids; Herbert Nafsiger, Benton Harbor; Otto Klenk, Sparta; A. L. Darbee, East Jordan; Harry Lurkins, Benton Harbor; E. J. Robinette, Grand Rapids; William Teichman, Eau Claire; Carl Buskirk, Paw Paw; Lloyd Spencer and Floyd Barden, South Haven; Robert Anderson, Covert, and Thomas S. Smith, Chicago, Ill.

Those from the Michigan State College and Experiment Station who talked on the subjects of their individual lines of research were Director V. R. Gardner, H. P. Gaston of the South Haven station, W. C. Dutton, Ray Hutson, Donald Cation, Stanley Johnston of the South Haven station and Herman Wyngarden.

J. R. Van Haarlem of the Vineland Agricultural Experiment Station, Ontario, Canada, and Dr. H. E. Barnard, secretary of the National Apple Institute, were the principal out-of-state speakers. Karl S. Reynolds of Sturgeon Bay, Wis., told the members the meaning of National Cherry Week.

Following the tradition of the society, Arlie L. Hopkins, Bear Lake, was re-elected president for his second term in this position. Other officers elected were W. K. Bristol, Almont, vice-president; J. A. Richards, Eau Claire, treasurer, and Don L. Hootman, East Lansing, secretary.

The sweepstakes award in the apple show was awarded to H. G. Waring of Kewadin, for the fourth consecutive year.

Some of the current demands of the Detroit apple market were presented by J. A. King of Detroit. This was a special marketing feature of the program.

## Planting Pecans

PECAN trees may be set out in the coastal plain and Piedmont sections of North Carolina any time from late November until time for growth to start in the spring.

But where winters are more severe, the best transplanting time is early in the spring, according to Robert Schmidt, associate horticulturist of the North Carolina Agricultural Experiment Station.

Pecans thrive on a great variety of soils: heavy clay soil, light sandy land, river bottoms that are well drained, but they will not do well on soil underlain with quicksand or hardpan, or on land

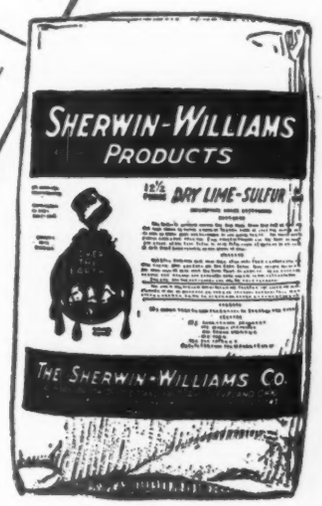
*(Continued on page 23)*

# For Fine Color and Waxy Finish on Your 1936 Apple Crop

THE SHERWIN-WILLIAMS CO.
New
DRY LIME SULFUR
1936 APPLE SPRAYING SCHEDULE
NO RUSSET
NO FOLIAGE INJURY
NO SCAB
SAN JOSE SCALE
DELAYED DORMANT
12 to 15 lbs. Dry Lime Sulfur
SCAB
CLUSTER-BUD OR PINK
3 lbs. Dry Lime Sulfur
SCAB
CALYX
2½ lbs. Dry Lime Sulfur and 2½ lbs. Hydrated Lime
SCAB
ONE WEEK TO 10 DAYS AFTER CALYX
2 lbs. Dry Lime Sulfur and 2½ lbs. Hydrated Lime
SCAB
THREE WEEKS AFTER CALYX
2 lbs. Dry Lime Sulfur and 2½ lbs. Hydrated Lime.
THESE DILUTIONS ARE PER 50 GALLONS OF WATER.
Add 1½ lbs. of Sherwin-Williams Arsenate of Lead to 50 gallons of water when necessary.

## Use This Modern Spraying Schedule

The fact that Sherwin-Williams Dry Lime Sulfur is chemically pure 33° liquid lime sulfur STABILIZED makes it the most dependable and safest summer spray to use on apples. Follow the Sherwin-Williams New 1936 Apple Spraying Schedule and grow more apples with fine color and finish — avoid russet. Write for a copy of Sherwin-Williams No Russet —No Scab Spraying Schedule for apples.



**THE SHERWIN-WILLIAMS CO.**
INSECTICIDE DEPARTMENT
101 PROSPECT AVE. · CLEVELAND, OHIO

The Original Dry Lime Sulfur
U. S. Patent No. 1264908, Jan. 29, 1918. Reissue Patent No. 14980, June 22, 1920.

# SHERWIN-WILLIAMS
## SPRAY AND DUST MATERIALS

## Nationwide News

Many years of experimenting have given J. Y. Jordan of Eastland, Tex., a seedless persimmon. This type of fruit is an oddity and Jordan has been growing the seedless variety for several years.

▲ ▲ ▲

Emphasizing the trend in all sections of the country for the construction of co-operative storages is the recent action of the Windham County (Vermont) Fruit Growers Association in voting to construct a storage of 75,000-bushel capacity.

▲ ▲ ▲

According to Dr. V. W. Kelly, extension horticulturist for Illinois, it takes about 19 fruit trees and 382 small fruit plants to supply a family of six with its annual fruit needs. This type of planting would produce approximately 80 bushels of tree fruit, 250 pounds of grapes and 340 quarts of small fruits. These estimates were issued to aid the farmer who plans to plant a home orchard with an expectation of fruit for eating from the hand and for canning.

▲ ▲ ▲

Trees infected with the phony peach disease are being destroyed in southern Illinois and in Georgia by WPA workers. In some sections work is being done by laborers hired by fruit growers' associations.

▲ ▲ ▲

Newcastle, Calif., shipped 965 cars of deciduous fruit this season. The 1935 Gravenstein apple crop of Sonoma Valley (Calif.) netted the association members 53 cents per box.

▲ ▲ ▲

Pruning demonstrations by specialists from the colleges and experiment stations of the various states have already been held and the reported attendance has been good. New trends in this old cultural practice are always helpful and more of the growers are taking advantage of these opportunities to get the latest hints on pruning.

▲ ▲ ▲

Poor grape clusters can be eliminated by proper pollination, according to the findings of F. E. Gladwin, grape specialist in charge of the Vineyard Laboratory of the New York Agricultural Experiment Station. He further states that interplanting of good pollen-bearing varieties is of practical value provided they are not planted more than 16 feet from the variety to be pollinated.

▲ ▲ ▲

Interesting talks, exhibits and discussions are the features of the various annual meetings of the state horticultural societies. Those that have already been held report good attendance and this shows that every grower is interested in gaining the latest facts.

# FROZEN FRUITS AND FRUIT PRODUCTS

*(Continued from page 9)*

containers and the addition of sugar to berries. Light colored fruit, particularly apples, apricots and peaches must be either frozen in syrup or treated with sulphurous acid solutions to inhibit browning. Sulphited fruits are used by bakers. Other methods for controlling flavor and color changes, such as destruction of enzymes by heat or by biologic means are not employed industrially in packing fruit. Although the freezing destroys large numbers of yeast, bacteria and molds, it does not result, as a rule, in sterilization so that the frozen product is perishable and must be stored at low temperatures (not over 15-20°F) until it is converted into manufactured product or used.

A number of kinds and sizes of containers are used to protect the fruit from oxidation, loss in flavor, absorption of cold storage flavors and odors and drying out. The most common is a 50-gallon paraffin coated fir barrel. The 30-gallon barrel and five and 10-gallon kegs are used also. Considerable quantities are packed in the 30-pound enamel-lined slipover top or friction top can and a limited quantity in smaller units.

The process of packing berries in the Pacific Northwest consists of the following steps, some of which are omitted by some packers or in handling certain fruits: (1) washing; (2) sorting; (3) grading for size; (4) conveying to container; (5) addition of sugar; (6) closing of container; (7) transportation to cold storage; (8) chilling in the "sharp" room; (9) storing at 15-20°F until shipped in refrigerator cars.

The proportion of sugar used varies with the fruit packed and the expected storage period. For long storage more sugar is used. The ratio of fruit to sugar is generally expressed thus, 2+1, meaning two parts of fruit to one part of sugar. There is a growing tendency to use less sugar than formerly. Over 85 per cent of the strawberries in 50-gallon barrels are packed 2+1 and less than 15 per cent as 3+1. Although in the 2+1 pack the flavor of the fruit and the flavor and consistency of the syrup are best, the berries are larger, firmer and of better color in the 3+1 pack in which less syrup is formed. Very few strawberries are packed in the ratios 1+1, 4+3, 1½+1, 4+1 and 5+1 and unsweetened or "straight." For strawberries in smaller containers the 3+1 pack predominates. Raspberries are generally packed either without sugar or 2+1 in 50-gallon barrels, the tendency being to increase the amount packed without sugar. In 1926, about equal quantities of raspberries were packed unsweetened and 2+1; in 1929 about 80 per cent of the pack was unsweetened and the remainder 2+1. In smaller containers of raspberries the 2+1 pack predominates. Loganberries and blackberries are generally packed like raspberries. The 3+1 pack predominates for other fruits.

Originally the barreled berries used to be chilled at 0°F in order to reduce the temperature of the contents sufficiently low to prevent fermentation during subsequent freezing. This resulted, however, in only a limited absorption of the sugar by the berries so that most of it settled to the bottom to form a thick syrup, leaving the top layers of berries exposed. To produce a more uniform distribution of sugar and fruit, various methods were developed of gradually adding the sugar as the barrels were filled. These were supplemented by a process of rolling the barrels during preliminary freezing to insure complete solution of the sugar in the juice extracted from the berries and the complete covering of all the berries with this syrup. This resulted in an improvement in the appearance, flavor and keeping quality. Immediate hard freezing was found unnecessary if this process of sugar curing was allowed to take place. It is necessary, however, to bring the mass of berries to about 32°F as soon as possible to avoid danger of fermentation. Slow freezing following this is generally safe.

Persimmons, avocados and other subtropical fruits which cannot be preserved by canning because of injury to flavor by heat are well preserved by freezing. In the frozen form they may be distributed for use in ice cream, ices and milk shakes.

Certain fruits can best be frozen in the crushed or pulped condition, either because they lose in texture when frozen whole or sliced or because they may best be distributed in crushed form. Where the fruit is used for ice cream, jam and general soda fountain use, it is preferred in this form. This is especially true of avocados and persimmons. By this means a product of good quality can be secured from blemished fruit unsuitable for packing whole or sliced. The prepared fruit can be ground, crushed or passed through a pulping machine. The resulting product retains the characteristic flavor and odor of the fruit. Avocados and persimmons should be peeled before crushing. Since pulping in a "tomato cyclone" beats too much air into

*(Continued on page 20)*

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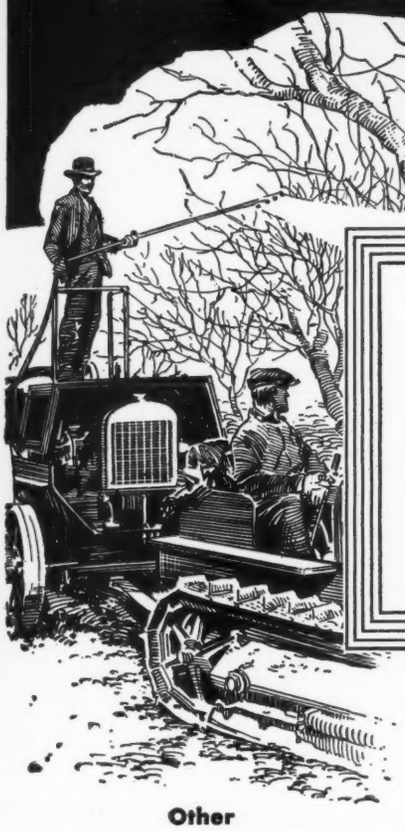

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# WHO'S WHO IN POMOLOGY
# • MISSOURI •

Although the number of workers engaged in horticultural work in this state is relatively small, their work is such that they are constantly receiving notice from co-workers in all sections of the country. So that more may know of the workers and what they are doing, the following listing is given.

### College of Agriculture and the Agricultural Experiment Station of the University of Missouri, Columbia.

**Leonard Haseman,** Ph.D., Professor of Entomology, University of Missouri, and Entomologist, Missouri Agricultural Experiment Station. In charge research work on codling moth and other insect pests. Publications on insect pests and their control.

**A. E. Murneek,** Ph.D., Associate Professor of Horticulture, University of Missouri. In charge of experiment station work on physiology of reproduction of horticultural plants, nutrition of fruit trees, pollination and fruit sterility. Publications on pear storage, fruit maturity tests, carbohydrate-nitrogen relationships in plants; senior editor, Textbook of Plant Physiology; junior author of textbook, Fruit Crops.

**H. G. Swartwout,** M.A., Assistant Professor of Horticulture, University of Missouri. In charge of spraying investigations and small fruit culture. Special work in spray injury and grape nutrition. Publications on small fruit culture.

**Thomas J. Talbert,** A.M., Professor and Chairman Department of Horticulture, University of Missouri. Special work and bulletins on sprays and grape pruning. Senior author of textbook, Fruit Crops; Associate Editor AMERICAN FRUIT GROWER.

**C. M. Tucker,** Ph.D., Plant Pathologist. In charge of research on plant diseases, Missouri Agricultural Experiment Station. Publications on diseases of various plants.

**C. G. Vinson,** Ph.D., Professor of Horticulture. Special work, virus diseases of plants.

### U. S. Dept. of Agriculture, Springfield

**M. A. Smith,** M.S. Special work, orchard spraying for disease control in the Ozark region.

### State Horticultural Society

**H. C. Hitz,** President, Fortescue.
**George Hunt,** 1st Vice-President, St. Louis.
**W. R. Martin,** Jr., Secretary, Columbia.
**Roy Wilhoit,** 2nd Vice-President, Springfield.

## CALENDAR OF COMING FRUIT MEETINGS AND EXHIBITS

**Jan. 7-8**—Arkansas State Horticultural Society annual meeting, Siloam Springs.—Mrs. Will D. Sweet, *Sec'y,* Siloam Springs.

**Jan. 7-9**—Maryland State Horticultural Society 38th annual meeting, Hotel Alexander, Hagerstown.—A. F. Vierheller, *Sec'y,* College Park.

**Jan. 7-9**—Nebraska State Horticultural Society winter meeting, College of Agriculture, Lincoln.—E. H. Hoppert, *Sec'y,* Lincoln.

**Jan. 8-10**—Idaho State Horticultural Assn. 41st annual convention, Statehouse, Boise.—W. M. Wicks, *Sec'y,* Boise.

**Jan. 8-10**—Massachusetts Fruit Growers' Assn. annual meeting, Memorial Auditorium, Worcester.—Wm. R. Cole, *Sec'y,* Amherst.

**Jan. 14-17**—New York State Horticultural Society 81st annual meeting and commercial exhibit, Rochester.—Roy P. McPherson, *Sec'y,* LeRoy.

**Jan. 15-16**—South Dakota State Horticultural Society winter meeting, Aberdeen.—W. A. Simmons, *Sec'y,* Court House, Sioux Falls.

**Jan. 16**—Vermont State Horticultural Society meeting in co-operation with Union Agricultural Society, Burlington.—M. B. Cummings, *Sec'y.* Burlington.

**Jan. 20-21**—Pennsylvania State Horticultural Assn. winter meeting, in conjunction with Pennsylvania Farm Show, Harrisburg.—R. H. Sudds, *Sec'y,* State College.

**Jan. 21-23**—Indiana Horticultural Society meeting and orchard supply exhibit, Manufacturers' Bldg., State Fair Grounds, Indianapolis.—Everett Wright, *Sec'y,* Lafayette.

**Jan. 27-Feb. 1**—Ohio State Horticultural Society annual meeting, Columbus, during Farmers' Week.—F. H. Beach, *Sec'y,* Columbus.

**Jan. 29-31**—New York State Horticultural Society Eastern Meeting and commercial exhibit, Kingston.—Roy P. McPherson, *Sec'y,* LeRoy.

**Feb. 5-6**—West Virginia Horticultural Society 42nd annual convention, Martinsburg.—Carroll R. Miller, *Sec'y,* Martinsburg.

## FROZEN FRUITS

*(Continued from page 18)*

the product, grinding or sieving is preferable for fruit that is easily oxidized, such as avocados, apples, peaches and apricots. The crushed or pulped fruit can be frozen without sugar in a tightly sealed container but the color and flavor are retained better when sugar is added. Some fruits should be packed with three parts of fruit pulp to one of sugar and others with six of fruit to one of sugar. The 6+1 or 5+1 pack is preferred by ice cream manufacturers. For dessert purposes a larger proportion of sugar is desirable.

The crushed fruit and sugar are mixed until the sugar dissolves and the mixture is then added to the storage container.

By freezing the screened crushed fruit at very low temperatures a finely grained product may be obtained which makes a delicious frozen dessert.

Fruit juices are most attractive when first expressed from the fresh fruit and will rapidly deteriorate after extraction unless immediately preserved. The frozen juice will retain its characteristic fresh flavor and odor and suffer no apparent deterioration during storage if it is protected from foreign odors and flavors. The expressed juice must be chilled and frozen as soon as possible after extraction.

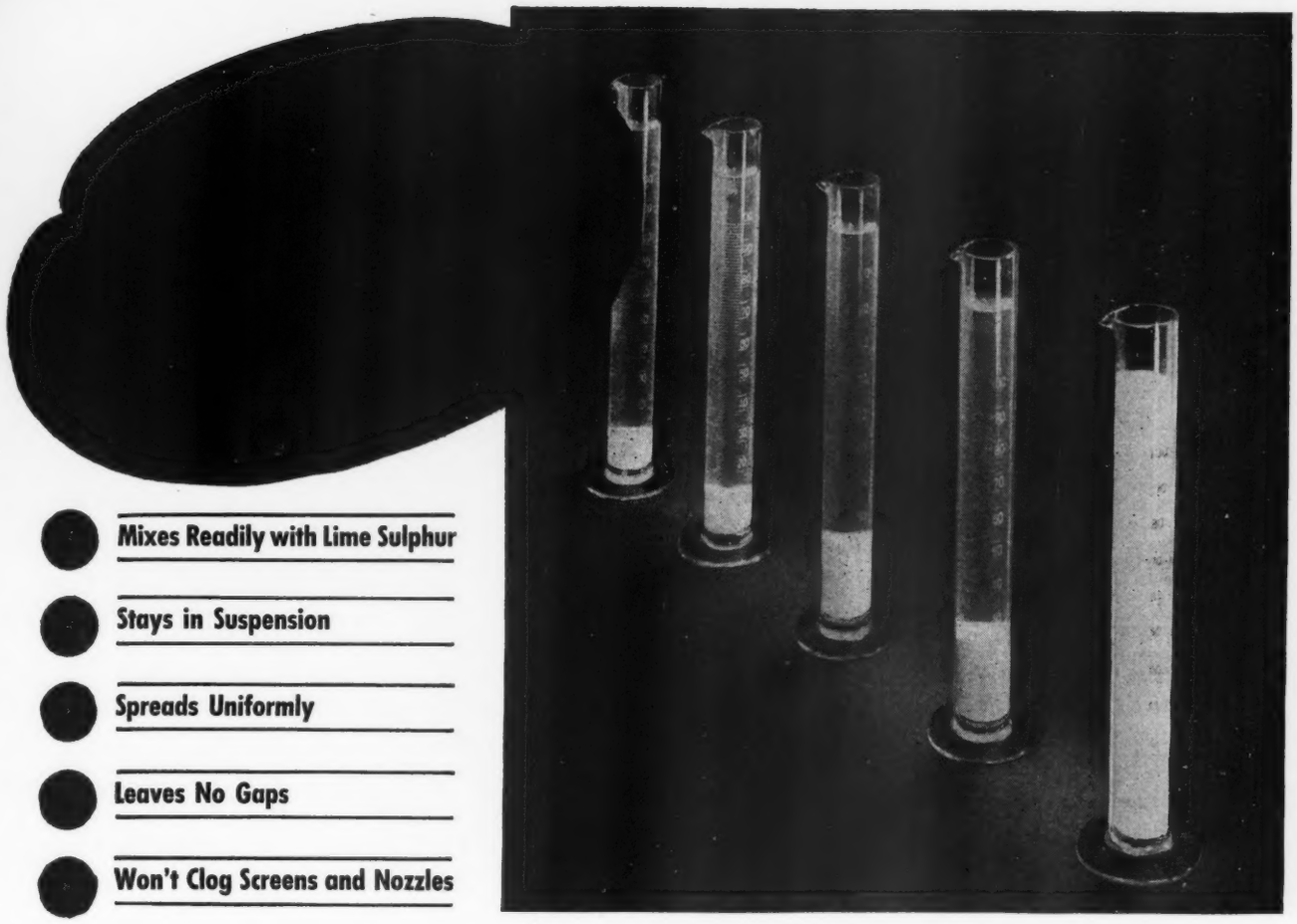
Although a number of fruit juices were frozen commercially a few years ago, only orange juice is still being packed, and that to a limited extent.

During the period of 1928-1930 a considerable amount of fruit was frozen in small cans and cartons for retail distribution and this outlet was thought to be important. However, owing to lack of proper distributing facilities and for other reasons this phase of the industry is still a very minor one and has not grown very rapidly. The institution trade (hotel, club, restaurant) has proved to be the more important of the two.

## APPLE SCAB

While leading a discussion of control measures for apple scab, Donald Cation of the Department of Botany of Michigan State College, said that experiments conducted by the Michigan station indicate that burning of the old litter beneath the trees for the destruction of scab spores did not work out as all of the spores on leaves in the fence row and isolated places could not be burned and that these few not destroyed would be sufficient to start infestation of the fungus in the spring.

The export market, tariff on foreign fruit and advertising are the problems of the fruit industry, according to Herbert Nafzinger of Benton Harbor, Mich., and he believes that all of the state societies should unite in working out these problems.



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Each succeeding year a greater number of growers express definite preference for and demand NuRexform. There are logical reasons:

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**It stays in suspension in water,** which assures the grower an even mixture throughout a tank full of spray. (Note the above photo showing NuRexform, at the extreme right, well in suspension after all tubes have been standing two hours.)

**No sediment**—this means the Arsenate of Lead, not some of it, but *all* of it, gets where it belongs—on the fruit and foliage.

**No waste**—none settles to the bottom of the tank to be scraped out and thrown away as waste material.

**No clogging of screens and nozzles**—this feature saves time and labor. The grower does not have to stop spraying operations at inopportune, in fact critical times, to clean screens and nozzles.

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# IMPORTANCE OF LEAF SURFACE

*(Continued from page 8)*

food early in the season to initiate flower buds, and not enough in late fall to bring about proper maturity of the tree's tissues. It is well established that in general fruit trees which have produced a heavy crop are more susceptible to winter injury than those which had little or no fruit. The less vigorous the bearing tree the greater the injury.

The leaf area per fruit required to develop the crop to the best size, color and quality, and at the same time meet the needs of the tree as a whole for food reserves, will vary with the variety and many other factors. In general, this will probably be considerably in excess of one square foot of leaf surface for each fruit. Since the average size of leaves for a given variety varies considerably in different localities and from one year to another, one square foot may mean from 30 to 75 leaves. Where there are too many fruits for the existing leaf area, the proper ratio may be brought about by thinning off excess fruits.

The sooner the proper ratio is established, the greater the chances of annual bearing and proper development of the fruit and tree. Obviously, less thinning will have to be done if the individual leaves are large or if the set is only moderate. A large leaf surface developed on many vigorous spurs will manufacture food for the tree during the early part of the season at a time when reserve food is needed to initiate flower buds for the following season. The leaf surface developed on prolonged shoot growth will not function most effectively for the tree as a whole until length growth has ceased. So long as a shoot is growing vigorously, it uses most of the food manufactured by its own and adjacent leaves. The leaves on shoots, however, usually remain active later in the season and help considerably in maturing the fruit and in building up the trees' reserves for the following year.

While a relatively large total leaf surface is fundamental in the production of fruit, the amount of food manufactured per hour or per day by a given leaf area—that is, its efficiency—must also be considered. If we are interested in the possibilities and limitations of our orchard practices it is important to know how the leaf surface of the fruit tree functions under different weather conditions, as, for example, on cloudy days or in periods of drought or unusually high or low temperatures. We need to know also how the activity of the foliage in respect to food manufactured will be influenced by such factors as soil conditions, fertilizers, spraying, pruning and fruiting.

It might be well to recall at the outset some of the facts about the structure and function of the leaf. The leaf consists of a thin green blade supported by a network of veins or ribs which unite to form a midrib. The leaf is attached to the stem by means of the petiole, which is an extension of the midrib.

A cross section of a small part of the leaf is shown in the accompanying figure. The interior of the leaf blade is composed mainly of a large number of cells, most of which contain many small green bodies. The material in these bodies gives the leaf its characteristic green appearance and is known as chlorophyll, or leaf color. Chlorophyll is responsible for the peculiar power of the leaf to build up carbohydrates from raw materials contained in air and water. The energy for the chemical changes involved is furnished by sunlight and the process is called photosynthesis.

The large cells just beneath the upper surface and at right angles to it are arranged parallel to one another, and they form the palisade layers. The cells just above the lower surface of the leaf are loosely arranged and provide a relatively large amount of air space. The veins and midrib shown in the cross section are made up of the conducting tissues which supply the leaf with water and also permit the elaborated food to be removed from the leaf blade of the stem.

The entire leaf is covered by a thin layer of cells which forms a kind of skin. On the underside of the leaf there are many openings through this layer. These openings, called stomates, are extremely small, and an average leaf may have about one-half to two million. If we think of the stomates as being about one inch long, then a leaf two by three inches would have to be enlarged to approximately one-half acre. The size of these openings can be adjusted by the leaf at different times of the day. As a rule the stomates are closed at night, and they are wide open early in the morning. They seldom remain open all day long, however, and when the weather is hot or dry they may be closed two or three hours before noon. The adjustment of the size of the opening is governed by delicate physical chemical reactions between the guard cells and adjoining epidermal cells, but it is also influenced by the available water supply. When there is a water deficit the stomates tend to close very early. So long as the stomates are wide open water vapor escapes freely, but water is conserved when they are closed.

Since the stomates afford a direct opening between the interior of the leaf and the surrounding air, they are of special importance in the process of photosynthesis. Relatively large

*(Continued on page 28)*

## STATE NEWS

*(Continued from page 16)*

that does not have good drainage.

Schley, Stuart, Success, Pabst and Alley are good varieties for the coastal plains. Stuart is best for the lower Piedmont, and Indiana and Busseron are good for the upper Piedmont and mountain areas of the state, Schmidt said.

The roots of trees for planting should be well wrapped or plunged into a barrel of water while waiting to be set out, as this keeps them from drying out.

The trees should be spaced 60 feet apart each way, with 12 trees to the acre. The holes should be about two and one-half feet deep and two feet wide, large enough to accommodate the tap root.

Only good topsoil should be used to fill the holes. Pack it firmly around the roots. Be careful, however, not to set the trees more than an inch or two deeper than they grew in the nursery.

The trees should be cultivated as a crop and it is advantageous to grow farm or garden crops between the rows of trees, but not too close to the trees.

Apply from one and one-half to two pounds of 4-8-4 fertilizer to each tree just before growth starts in the spring.

---

### Rhode Island Pruning

MANY fruit growers begin their pruning in December. There are at least two reasons, however, for delaying pruning about two months. One has to do with the movement of food materials and the other with winter injury.

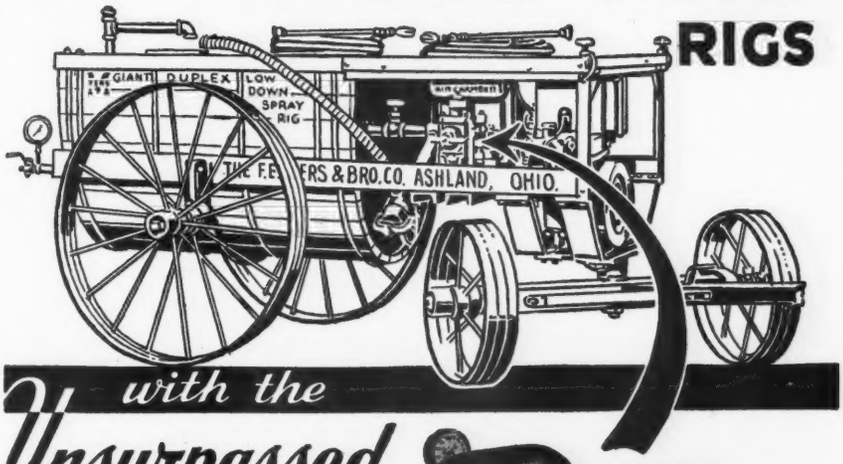
A late fall this year resulted in the leaves manufacturing plant foods a month or so longer than is usual. These foods will normally move in considerable quantities from the young wood (where it was manufactured) to the larger limbs, crotches, trunks and finally to the roots. Early pruning of any considerable amount of wood will remove much of this food material before it can get to the larger limbs. This loss may be avoided by delaying the pruning.

The severe winters of the last two years have resulted in extensive injury to the wood. It has been noted quite generally that early pruned trees were more severely injured than similar trees pruned later. Since we have had some of our coldest weather both years in early February, it would seem desirable to delay pruning until after that date, if possible. In larger orchards where pruning must be started earlier in order to be completed in time it is best to prune young, vigorous trees first. The making of large cuts in either young or old trees should be delayed as long as possible.

Narrow crotches often result in broken branches. Many of these crotches may be greatly strengthened by the use of wire or bolts. Where it is possible to find three or more limbs above a crotch so located that a triangular brace can be made, wire is very satisfactory. Large screw eyes are placed two to four feet above the crotch on the inside of the limbs. Two or three strands of a No. 10 or No. 12 galvanized wire are run from screw eye to screw eye. By inserting the handle of the pliers between the strands at the middle and twisting, the wires can be tightened. For a brace in the trunk itself or between two branches, a bolt or iron rod may be used. This bracing may be done in early winter while delaying the pruning.

A great deal of fruit is in home or commercial storage this year. Much of it will come in to the market shriveled and scalded. These conditions may be prevented to some extent. Shriveling may be due to immaturity of fruit when put


# MYERS POWER SPRAY RIGS

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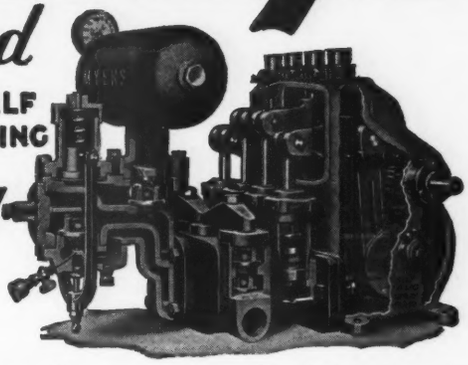

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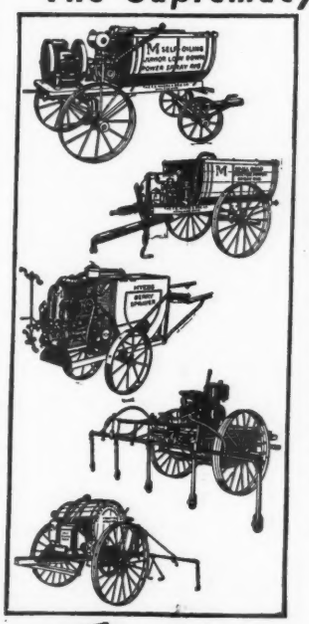

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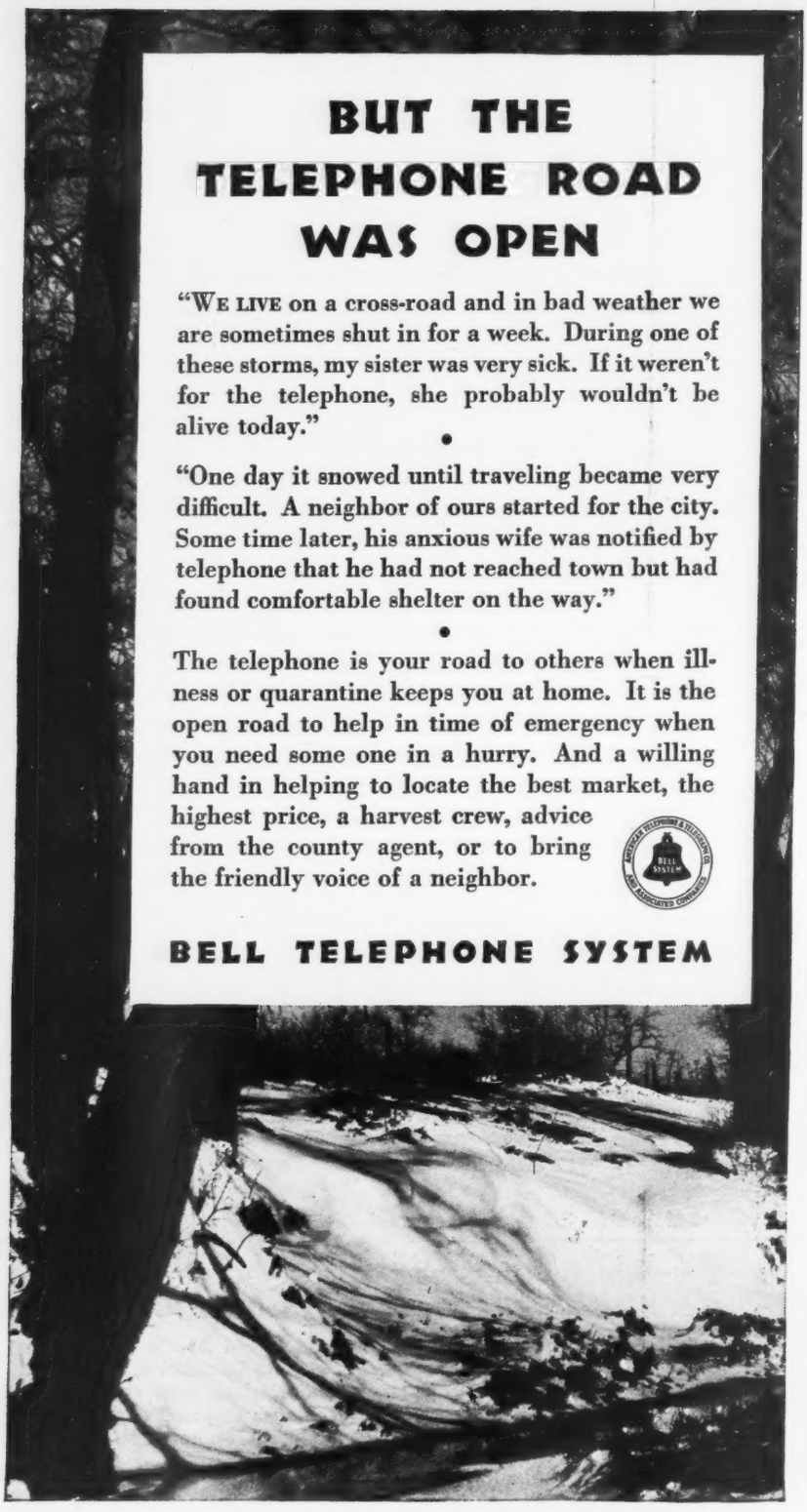
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into storage or to a lack of moisture in the air. Immature fruit will tend to shrivel anyway, and had better be moved as soon as possible. Wetting down the floor frequently will help to increase the humidity. A small electric fan directed over a pan of water will be very helpful.

Scald is a physiological difficulty brought about by an accumulation of gases given off by the fruit. Immature fruit and the green side of fruit are most susceptible. High temperatures after the fruit is removed from storage do not cause scald but do increase the rate of development.

A constant movement of air in the storage will tend to reduce scald, since the air movement prevents the accumulation of toxic gases on the surface of fruit.

E. P. CHRISTOPHER,
*Extension Horticulturist.*

## Washington Freeze Survey

AFTER completing a survey of seven central and eastern Washington counties, Dr. John C. Snyder, extension horticulturist, reports that damage to fruit and nut trees by the November freeze does not appear to be generally alarming, but growers are advised to wait until the extent of damage is more definitely determined before beginning to prune trees which are thought to be seriously damaged.

It will take a period of warm weather to bring out the extent of injury and show whether discoloration of bark is permanent or temporary, Snyder says. He states that seriously injured trees cannot be pruned intelligently until the extent of injury can be determined more accurately than can be done now. Early pruning, particularly when the wood goes into the winter in an immature condition, as trees in the Pacific Northwest have done this year, is sometimes injurious because of the slowness with which the wounds heal. The shock of the recent freeze may have a decided weakening effect upon the trees. An appreciable amount of twig injury may have essentially the same stimulating effect upon the trees as pruning does.

Trees affected include apples, pears, sweet cherries, apricots, English walnuts and European grapes. Peaches and sour cherries appear to be unhurt. Romes seem to have suffered worst among the apples. In areas of greatest damage the early bark of the last several years' growth has turned brown. This is particularly true of Rome apples, sweet cherries, English walnuts and apricots. This browned condition is distinctly abnormal, but fruit trees sometimes make marked recoveries from winter injuries, Snyder points out.

In the most severe cases of damage to apple trees, the inner bark, including the cambium layer of wood from one to four years old has turned brown. Fruit buds on most seriously injured apple trees show a slight browning. The spurs show an abnormal brown condition particularly in the cambium area. In areas where damage has been slight, discoloration is less marked.

Pear spurs show considerable discoloration. The inner bark, including the cambium, on English walnuts has turned black.

Counties visited by Snyder were Asotin, Columbia, Walla Walla, Benton, Franklin, Yakima and Chelan.

## Indiana Plans Exhibit

THE 75th annual meeting of the Indiana Horticultural Society, which will feature a large orchard equipment exhibit along with the educational program, is attracting considerable early attention and comment by the membership in general. This will be the first exhibit meeting held in the state for several years and that fact alone should help to boost the attendance column.

The meeting is scheduled for January 21, 22 and 23 at the Manufacturers' Building in Indianapolis. Almost 15,000 square feet of space had been reserved by supply companies by the middle of December and several other companies were contemplating being represented at the exhibit. Hotel facilities are ample in Indianapolis, and the secretary will have information relative to room facilities near the Manufacturers' Building. Arrangements have been completed for excellent restaurant service right in the spacious building, as these facilities are a part of the permanent arrangements in the building.

Growers and men in horticultural and associated professions from other states are heartily invited to meet with the Indiana Horticultural Society membership and their friends. Plans for the program have given attention to practically all major problems peculiar to Indiana growers, with ample opportunity for individual questions and discussions. Dr. B. F. Driggers, entomologist, New Jersey Agricultural Experiment Station, New Brunswick, will probably be most outstanding among the out-of-state speakers, as his experiences with the eastern codling moth situation have been extremely broad and valuable in the fight against this common pest.

The state organization is continuing to work in hearty accord with the efforts of the National Apple Institute for the increased consumption of apples. Many apples are remaining in storage in an effort to let the markets clear up some-

what and it seems probable that the holiday buying will enliven the market considerably in most areas served wholly or partially by Indiana orchards.

The secretary enjoyed attending portions of both the Michigan and Illinois state horticultural meetings where most of his time was spent in talking over arrangements and reservations with company representatives for the Indiana meeting. Both meetings were good, although the attendance did not seem to be up to par.

Remember the dates—January 21-23, at Indianapolis.

EVERETT WRIGHT, *Sec'y*,
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## Trappers' New Book

SOME of America's most successful trapping sets and pelt-preparing methods are described by their originators in the new 1935-36 issue of "Tips to Trappers."

Although published by Sears, Roebuck and Co., the real authors of this unusual book are followers of the trapline, whose articles make up the greatest portion of the contents. The illustrations are chiefly snapshots contributed by trappers and fur farmers, along with their hints and suggestions on how to catch the wary fur bearer.

Many of the trapper-authors were award winners in Sears Sixth National Fur Show held last season. In this competition, 396 cash awards, in addition to two new automobiles, were earned by fur shippers who prepared their pelts most skillfully. C. L. Probus of Leitchfield, Ky., received the $750 First Major Award; while Charles Groves of Trenton, N. J., and Pete Amdam of Kelliher, Minn., each landed one of the special automobile awards.

This season's Seventh National Fur Show will again offer $4,750 in awards to trappers. Complete details are given in the new "Tips to Trappers" book which may be obtained free of charge by addressing AMERICAN FRUIT GROWER.

Dr. H. W. Anderson of the University of Illinois, told the Illinois meeting, at Decatur, that 25 years ago a prominent grower of Illinois said, "We can lay down certain fundamental rules for spraying, but these must be altered to meet specific situations." Dr. Anderson stressed the point that the same is true today, that conditions in all orchards are not the same and that this fact must be reckoned with in planning the spray program from the recommended schedule.

"The storing of apples has kept black ink on the ledger," stated Otto Klenk of Sparta, Mich., while talking at the Michigan meeting on his experiences with fruit storage. Mr. Klenk, who operates a fruit farm with his brother and father, has a storage of 11,000-bushel capacity.

While presenting his message to the opening session of the 80th annual meeting of the Illinois State Horticultural Society, President George F. Shoff, Peoria, told the older members of the society that they were on the spot as they were looked to for guidance and advice by the newer and younger members of the group.


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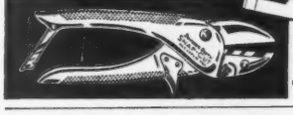
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# Notes and News from the Field

IN his address to the members of the Michigan State Horticultural Society, President Arlie L. Hopkins of Bear Lake, said, "Pioneering in acreage is gone, but pioneering in new fruit varieties, in the fight against insects and diseases and in overcoming the effects of the drought is now more important than ever.

Forethought of an experienced grower was ample reward last season when a hail storm that lasted for ten minutes and with hail stones the size of hickory nuts ruined the crop of Russell Evarts, prominent Hunters Creek, Mich., grower, but it was covered with insurance and he received a nice adjustment on what might have been a total loss.

C. Taylor, Albion, Mich., told his fellow members of the Michigan society that too much emphasis had been placed on fruit production in the past and not enough on sales. He advocates the balancing of production and selling endeavor.

"When thinking of the fertilizer problem, the entire orchard area must be considered," stated Dr. J. H. Gourley, Chief in Horticulture at the Ohio Agricultural Experiment Station, when he talked before the Illinois State Horticultural Society meeting.

Dr. M. J. Dorsey, Chief of the Department of Pomology, University of Illinois, told the Illinois meeting that orchardists of Washington use surface plants to indicate the time to apply water. When these plants wilt the Washington growers know that at least two-thirds of the surface roots of the tree are dry and that it is time to irrigate.

The 1935 meeting of the Michigan State Horticultural Society was the first attended by T. A. Merrill in his recently acquired position as extension horticulturist for Michigan State College. Mr. Merrill took the place of G. L. Ricks when the latter resigned on September 16.

The recently organized Illinois 95 Per Cent Clean Apple Club received several new members at the meeting of the Illinois society. A story of this club and the new members will appear in an early issue of AMERICAN FRUIT GROWER.

W. C. Dutton of the Michigan Agricultural Experiment Station told the Michigan society meeting that zinc and calcium arsenate, alone, are not as safe in the spray program as lead arsenate. Correctives with the zinc and calcium arsenate will lessen the injury.

Boxes for apple packing and sale were in great demand by the Chicago trade during the past season, according to Thomas S. Smith, grower near Benton Harbor and Chicago commission man. Mr. Smith is a veteran of the fruit deal around Benton Harbor and his talk also brought out the fact that half-bushel boxes of peaches with purple crepe paper as a liner sold good the past season.

J. R. Van Haarlem of the Vineland Experiment Station, Ontario, Canada, told growers attending the 1935 Michigan society meeting that chlorosis is usually found on soil that is too alkaline and which is high in calcium carbonate.

In his talk on the branch method of thinning, H. P. Gaston of the South Haven (Mich.) Experiment Station stated that the productiveness of a branch depends on its diameter and that the thin-wood pruning and branch thinning methods are based on this fundamental.

Speaking before the Michigan State Horticultural Society meeting, August H. Teske of Blacksburg, Va., stated that increasing numbers of Virginia growers are building their own cold-storage plants to increase their domestic sales and to care for the expansion of truck trading.

Director V. R. Gardner of the Michigan Agricultural Experiment Station stated, at the Michigan meeting, that of all of the dozens of materials that had been used in experiments for the control of codling moth, lead arsenate was still the best control measure. He also stated that the thin-wood method of thinning was the greatest contribution to the art of pruning in the last 25 years.

## CHAMPIONS OF BETTER APPLES

*Staff Photo*

**Two chemists paused for brief conversation at the Michigan meeting in Grand Rapids when Dr. H. E. Barnard, secretary, National Apple Institute (left) met Waldo L. Scovill, lead residue analyst for the Michigan Department of Agriculture.**

## Northern Nut Growers Discuss Blight Resistant Chestnuts

THE passing of the American chestnut due to the ravages of chestnut blight has stimulated considerable interest in the Oriental species of this nut, many of which possess considerable resistance to the disease. The U. S. D. A. and various amateurs have made considerable progress in developing and propagating superior clones of chestnuts. H. F. Stoke, of Roanoke, Va., who discussed the Oriental chestnuts before the Rockport meeting of the Northern Nut Growers' Association, has contributed the following notes. A nut nurseryman with considerable experience in chestnut cultivation, he is well acquainted with this group.

Of the five or more chestnuts and allied species found in the Far East, the Chinese Hairy chestnut, *Castanea mollissima,* and the Japanese chestnut, *Castanea crenata,* are the most promising from the horticultural standpoint. Of the two, the Chinese chestnut most nearly resembles the American chestnut in size and flavor. The tree does not grow so large as the American species, but in size and form more nearly resembles a well grown apple tree. Like its American cousin, it will grow on poor and acid soil. It is blight and drought resistant to a high degree.

The young twigs are gray in color and covered with short, fine dark hairs, hence the name "hairy chestnut." The leaves are large and wrinkled, and hang on the tree well into the winter. The burrs usually contain three nuts, but may have as many as six. The spines are short and stiff. The husk is thick, which may account in part for comparative freedom from attacks of the chestnut weevil. Chinese chestnuts average larger than the American species, and are similar in flavor and sweetness. The pellicle is less infolded and often shells off free from the kernel.

Certain superior strains of Chinese chestnuts are being developed as named varieties, among which are some that average as large as European chestnuts and are superior in flavor and texture to any ever sampled by the writer.

Bearing begins in the seedling tree at from three to eight years. Blossoming occurs in June and the nuts ripen in September, several weeks earlier than the American chestnut.

The Japanese chestnut tree is similar in form and size to the Chinese. The leaf is somewhat smaller and the bark of the young twigs is reddish brown, quite like those of the American species. Nuts average larger than those of any other species, some of the horticultural strains producing nuts more than two inches across. In Japan the nuts are never eaten raw, but are boiled or roasted. When thus prepared they are excellent. In some districts they are a staple article of diet during the chestnut season.

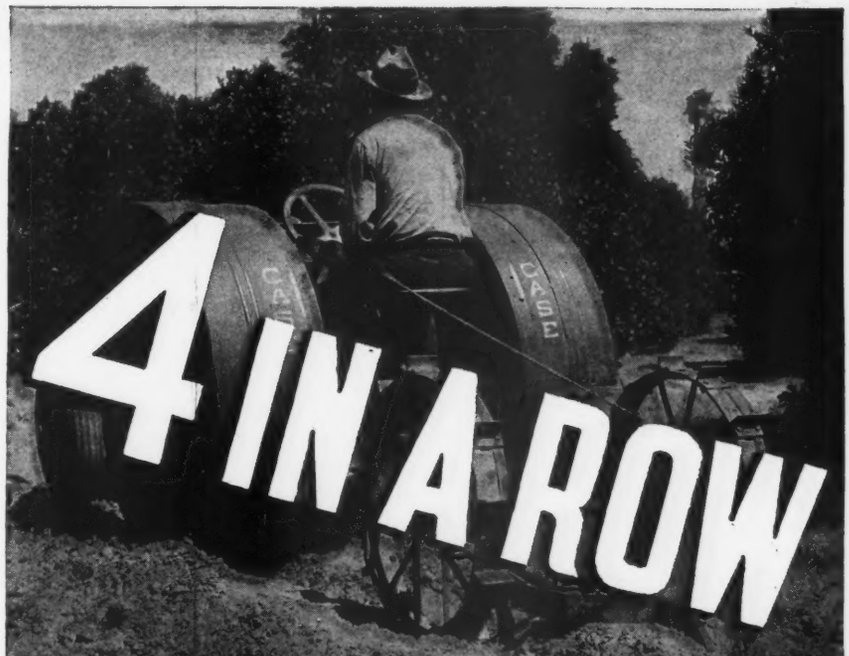
The trees are very productive and begin bearing at a very early age. The limit of precocity seems to have been reached by one tree in the nursery of the writer, which was planted from seed in the spring of 1932, and bore a well-filled burr in 1933.

Experiments carried on by the late Dr. Walter Van Fleet and others to produce desirable hybrids have met with considerable success. Hybrids produced by crossing the American chinkapin on Oriental chestnuts have resulted in producing some excellent nuts with considerable blight-resistance. American x Oriental hybrids seem to be uniformly subject to blight.

Test plantings of Oriental chestnuts throughout the eastern states during the last 20 years have produced encouraging results. The trees have been found winter-hardy to 30 degrees below zero. They seem to do equally well in the sandy soils along the sea coast and in the granitic soils of the Blue Ridge mountains.

At the present time the U. S. D. A. is engaged in extensive breeding experiments looking to the development of superior horticultural and timber-producing strains. While it is perhaps too much to hope that those living will ever again see forests of chestnut in the eastern states, it is virtually a certainty that commercial orchards of fine chestnuts will become a reality in a comparatively few years.

GEORGE L. SLATE, *Sec'y,*
Northern Nut Growers' Association,
Geneva, N.Y.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# IMPORTANCE OF LEAF SURFACE

*(Continued from page 22)*

amounts of air can still pass in and out of the leaf even though the stomates are only partly open, but when they are closed tightly free movement of air is inhibited. An abundant supply of air is required for photosynthesis, since it provides the carbon dioxide, which is one raw material used in the process.

By determining the composition of air before and after it leaves a closed chamber containing the leaf surface, and if we know how much air has been supplied, we can calculate the rate of photosynthetic activity of the leaf at any hour of the day. This rate is conveniently expressed in terms of the milligrams of carbon dioxide removed per hour per 100 square centimeters of leaf surface. A mature apple tree can manufacture about a pound of food per hour if its leaf surface is functioning at a normal rate of about 10 mg. per hr. per 100 $cm^2$, or about one ounce per 300 square feet of leaf surface. To manufacture this amount of food would require all the carbon dioxide found in about 65,000 cubic feet of air, since the normal atmosphere contains only about three parts in 10,000 of air. Normally, however, less than 10 per cent of the available carbon dioxide is removed by the leaf, so it really would require something like 600,000 cubic feet of air per hour to furnish the raw material needed by a mature apple tree. Fortunately, there is an unlimited supply of free air.

There is considerable difference in the rate at which the foliage from a given tree removes carbon dioxide from the air at different hours of the day and on different days during the growing season. Some of these differences are clearly associated with weather conditions.

As a rule, the leaves are most active on bright, clear but cool days, and they are least active when there are heavy clouds. For example, the average rate of carbon dioxide assimilation on five cloudy days was just about one-fourth as much as the average rate shown by the same leaves on clear days. During the middle part of a clear day there is more light than the leaf needs, but on a cloudy day there is usually not enough light to carry on maximum activity. The occurrence of a number of dull days in succession during a critical period in early summer might well be a determining factor in bringing about a set of internal conditions in the tissues of the tree that would profoundly influence the type of vegetative growth or the initiation of flower buds for next year's crop.

As a rule, the leaves manufacture about 10 to 20 per cent more food in the morning than they do in the afternoon hours, provided the morning is clear. This difference is especially noticeable on hot days when the sun is shining brightly and when the humidity is low. During such periods moisture is lost more rapidly from the leaf than can be replaced rapidly from the soil. Water may thus easily become a limiting factor during a part of the day and the stomates will tend to close earlier than usual. Water is also directly concerned in photosynthesis since it furnishes some of the raw material from which carbohydrate food is built up.

The conservation of soil moisture by the use of a heavy straw mulch or by the destruction of grass or weeds, and the practice of irrigation in exceptionally dry weather will help to provide a good supply of water in the soil and thus tend to provide more favorable conditions for photosynthesis. However, before the soil moisture can get into the leaf tissues it has to be taken up by the root system and transported through the conducting tissues of the trunk and branches. If the water is to be removed from the soil rapidly by the tree, there must be a large root surface in contact with the moist soil particles. Furthermore, there should be a thick layer of sapwood in the trunk and branches so the movement of the water will not meet with too much resistance. Water can still pass through older wood in the trunk and branches, but the youngest wood nearest the bark is most efficient. Where favorable conditions for water supply to the leaf exist, the water shortage will not appear as early in the day as under unfavorable conditions. The stomates will remain open several hours longer each day and the leaf surface will be more efficient in producing food. Where the root system is confined to a shallow layer of soil close to the surface, or where the trees have made a weak vegetative growth with small conducting tissues, the foliage may frequently suffer for water even though the soil is fairly moist.

Apple leaves are likely to be more active in photosynthesis during the relatively cool days of early spring and late fall than during the very hot days of midsummer. While the high temperature in itself may be injurious to the leaf tissue, it probably exerts its greatest influence through its effect on transpiration. The loss of water from the leaf on cool days is only a small fraction of that lost when the atmosphere shows a high evaporating power.


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The leaves on different trees and on different parts of the same tree may show a marked difference in their ability to manufacture food. Generally speaking, the darker green leaves are the most efficient in manufacturing food; e.g., an average of 50 determinations with light green foliage indicated a rate of 4.1 mg. hr. 100 cm.² while the dark green leaves at the same time showed an average rate of 12.1 mg. hr. 100 cm. The dark green leaves were just about three times as efficient on the average as the light green foliage.

The color of the leaf, as you know, may be influenced by the nitrogen supply. Where nitrogen applications cause the foliage to be darker green, it also brings about a marked increase in the efficiency of the leaves in producing more food. For example, before applying fertilizer the average rate of two similar trees was 10.6 and 9.8 $Co_2$ mg. hr. 100 cm.² respectively. Two or three weeks after fertilizer was applied to tree A, with B remaining as a check the rates were: for A, 12.8 mg. $Co_2$ hr. 100 cm² and for B, 9.9 mg. $Co_2$ hr. 100 cm², and two months later A produced 17.7 mg. $Co_2$, hr. 100 cm², and B, 7.9 mg. $Co_2$ hr. 100 cm². These two trees showed approximately the same rate of food manufacture at the outset, but the leaves on the fertilized tree became twice as active within two months' time.

Light green foliage may also be caused by soil conditions unfavorable for extensive root development or by injuries to the different parts of the tree. Any cultural condition which results in a dark green color until the end of the season enables the leaf surface to function to its fullest capacity whenever weather conditions are favorable. Photosynthesis may be carried on until the day before the leaves are frozen if the leaves remain green.

The efficiency of the leaf depends also upon the rate at which the food is utilized by other parts of the tree. Other things being equal the leaf area accounts for more food during the year the tree bears a crop of fruit. If the food is not used for shoot growth or for fruit development, it tends to accumulate in the leaf blade and as a result there is a reduction in the rate of photosynthetic activity. Such an accumulation of food is also caused by ringing. The leaves on ringed branches produce only about 30 to 50 per cent as much food per given area compared with foliage on normal branches. As the leaves grow older they likewise tend to lose their efficiency in manufacturing food.

Certain spray practices may have a profound influence on the ability of the leaves to manufacture carbohydrates. Under certain conditions spraying with lime sulphur may reduce the efficiency of the leaf to a considerable extent. For example, the average rate of photosynthesis before spraying for two lots of comparable trees was 32.8 and 33 mg. $Co_2$ hr. 100 cm² respectively for A and B. Two days after spraying with lime sulphur 1 to 40 the leaves on lot A were only 53 per cent as active as the unsprayed lot B. This reduction may occur even though there is no visible burning or spray injury of any kind.

The amount of reduction in the efficiency of the leaves by lime sulphur depends largely upon the condition of the foliage at the time it was sprayed, as well as upon the temperature and water supply to the tree. A weak tree growing on poor soil is particularly susceptible during hot, dry weather and may show as much as 90 per cent reduction. Trees that have dark green foliage may show only a 10 to 25 per cent reduction. Some oils used for summer spraying may have a similar influence in reducing photosynthesis. Certain sprays such as dry mix and some dusts apparently have no influence on photosynthesis. They are usually not the most effective fungicides or insecticides. No spray material has as yet been found which increased the efficiency of the apple leaves above normal.

Spraying, of course, is necessary because in all likelihood the diseases or insects would cause a much greater loss of food to the tree. Obviously, any injury which eliminates a part of the leaf surface would tend to reduce the total amount of food that could be manufactured. It is important, however, that those who are concerned with the development of our spray practices should keep in mind that while the spray material must be effective in controlling insects and diseases without causing obvious spray injury to the fruit or foliage, it is also necessary that the materials should not interfere with the proper functioning of the leaf. The invisible spray injury may influence the crop by retarding the development of size or the color and quality of the fruit, and in some cases by aggravating the tendency toward alternate bearing.

In this discussion the object has been to call attention to the important function of the leaf in building up carbohydrate food, which is fundamental in the growth and fruiting of the tree. Practically all of our cultural practices may have an influence on the ability of the leaf to provide additional food. It must be recognized, however, that the weather conditions may have an even greater influence in determining the rate of photosynthesis. Our cultural practices should favor the development of a large leaf surface early in the season and to keep this surface supplied with water and nutrients so it can work efficiently whenever the weather conditions permit.


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# THE APPLE EXPORT SITUATION

*(Continued from page 7)*

market cannot absorb without heavy losses to producers. It is a situation which cannot continue without capital losses beyond the ability of the industry to stand.

In a brief summary of results of trade barriers, I will refer to only a few of the leading countries as consumers of United States apples, and as illustrative:

The Ottawa Trade Pacts became effective August 19, 1932, whereby Britain established a duty of 4s/6d per hundredweight, equal at this time to about $1.40 per barrel and 43½ cents per box and basket. During the 1931-1932 season United States exports to Great Britain were 1,905,600 barrels and 3,475,100 boxes. As a result of the trade barriers they dropped in 1934-1935 to only 427,877 barrels and 2,095,142 boxes.

Germany was our second best customer, having taken in 1930-1931, 473,500 barrels and 3,475,000 boxes. Last season Germany dropped to 17,357 barrels and 557,339 boxes. This season Germany has practically disappeared as a market.

Holland dropped from 392,000 barrels and 2,244,000 boxes in 1930-1931 to 14,529 barrels and 612,007 boxes last season.

Argentina went down from 156,900 barrels and 256,977 boxes in 1930-1931 to 15,190 barrels and 76,978 boxes last season.

The United States, instead of exporting from 18.1 per cent to 20.5 per cent of the commercial crop, as it did when trade channels were open, exported last season only 10.6 per cent of the commercial crop.

The above is illustrative of what has taken place.

This season the volume of exports shows much better than last year. To November 30, the United States has exported 5,542,746 bushels, against 2,813,913 last season, or an increase of 103 per cent. This is due to the abnormally short crop in Europe, and is something which cannot be relied upon. With a large crop in Europe, United States exports, under trade barriers, would be no larger than last year.

The points which all of the foregoing would seem to indicate are:

*First*—Trade channels must be opened.

*Second*—In lieu of that, then some other method of disposing of the surplus must be accomplished. We do not have too many good apples, but we do have too many good and bad apples.

I am offering no solution as an alternative to the opening of trade channels, whether by the unimpeded operation of economic law which did take place following the then big crop of 1896, or whether by other means. These are questions, however, which demand your most earnest thought.

# AMERICAN POMOLOGY

*(Continued from page 12)*

bargoes of one kind and another have retarded the export trade in all foreign countries. The State Department at Washington has this year successfully negotiated favorable terms with several nations whereby American apples may be exported on a more satisfactory basis."

Dr. W. S. Blair, of the Dominion Experimental Farms, Kentville, Nova Scotia, in his paper stated that there are about 40,000 acres of apples in Nova Scotia, with 25,000 acres in Kings County alone. The production in Nova Scotia this year was 1,500,000 barrels, and 800,000 barrels have already reached the foreign market at satisfactory prices. The province depends very largely upon its export market for disposing of its fruit. Golden Russet, Bramley, Cox Orange, Ribston, Northern Spy and Tompkins King are all well grown for the export trade. Golden Russet is the best money maker as an export apple.

The work of the National Apple Institute was vividly described by Dr. H. E. Barnard, secretary of the N. A. I., Indianapolis, Ind., and by President B. S. Pickett, Ames, Iowa. The clip sheet prepared by the N. A. I. is sent to newspapers and magazines and reaches upwards of 27,000,000 readers. President Pickett described the organization of the N. A. I. and its financial status. A large group of midwest and eastern state horticultural societies have come in on the plan and have given some of the financial assistance needed to get the work under way. It was pointed out repeatedly at different sessions that fruit growers must take steps to stimulate apple consumption in this country. That there is little hope of recapturing a once active export trade is the opinion of experts. This makes it imperative to stimulate home consumption of apples and this is the purpose of the National Apple Institute.

## Wilder Medal Awards

A silver Wilder Medal Award was given to the Connecticut State College, Storrs, for a well-grown and well-selected educational exhibit of 92 old and new varieties of apples. Also, a silver Wilder Medal was awarded to the Dominion Experiment Station of Kentville, Nova Scotia, for an equally well-grown and well-selected educational exhibit of 73 varieties of apples, many of them being of Canadian origin.

Two new red sports as new varieties were also entered for an award, but the committee in its report stated that "neither variety has been tested to the extent required by the committee and, therefore, are not yet eligible for a Wilder Medal."

## Meeting Place Selected

At the last official A.P.S. meeting, held Thursday evening, an invitation to the A.P.S. to meet with the Virginia State Horticultural Society in December, 1936 was read and favorably acted upon, pending, however, final arrangements by the officers of the A.P.S. and the Virginia society for the meeting.

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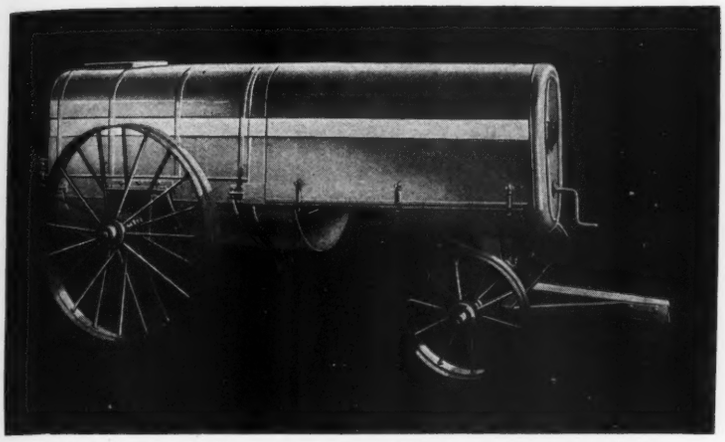

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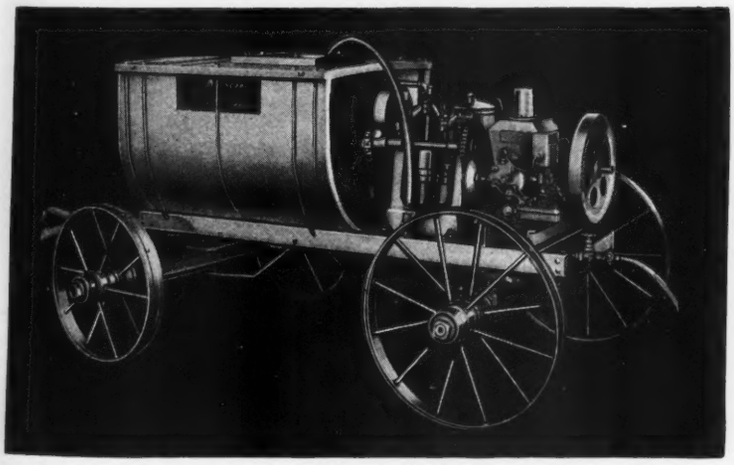

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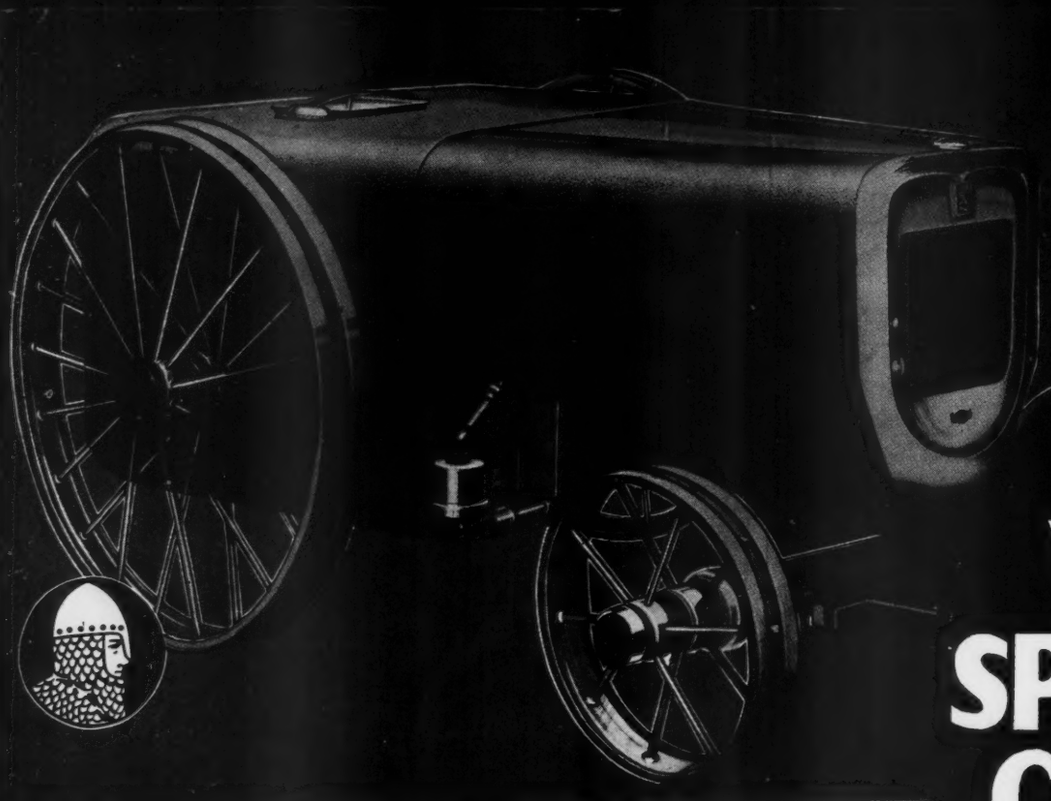

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